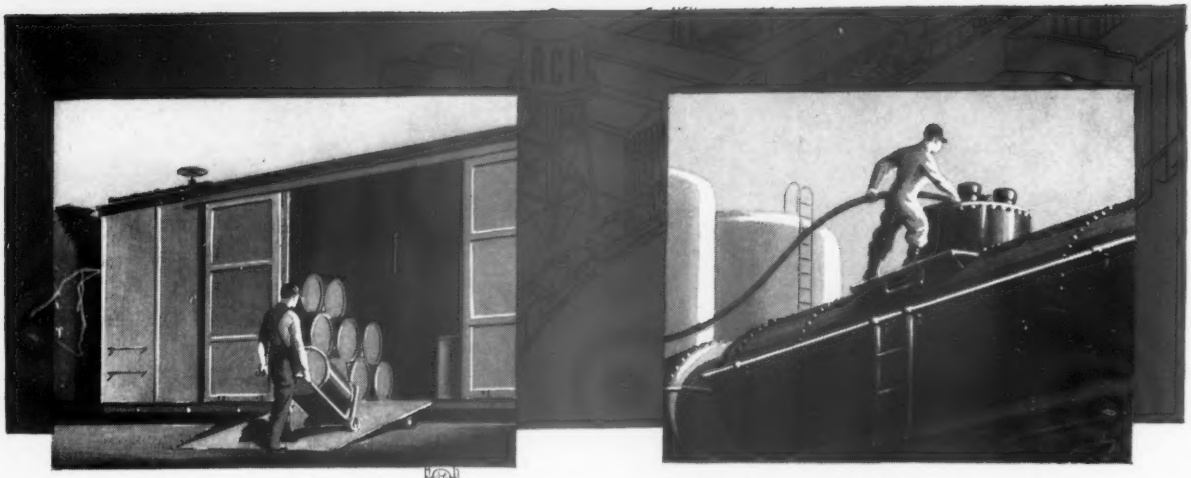
PAINT and VARNISH Production

THE TECHNICAL MAGAZINE FOR MANUFACTURERS OF PAINT, VARNISH, LACQUER AND OTHER SYNTHETIC FINISHES

NOVEMBER

1951



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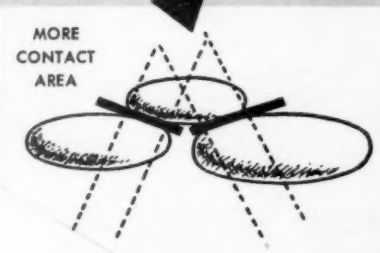

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PAINT and VARNISH Production

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint & Varnish Record)

VOL. 41 NOVEMBER 1951 NO. 11

NEXT ISSUE

An interesting report on the use of phenolics in varnishes will appear in the December issue. This report is based on experimental work concerned with an evaluation of various phenolic resins to ascertain their usefulness in varnish formulations. Such topics as the influence of catalysts, the influence of pH, rate of reaction, phenolic varnish formulations, and properties of such varnishes will be discussed in detail.

FEATURES

DEPARTMENTS

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Editorial Comment

The Case of Black Plate Cans

AT THE recent National Association meeting in Atlantic City, Harvey Paul Smith of the Metal Container Section, NPA discussed many of the present problems encountered with black plate cans in order to conserve tin.

"This conversion seems to have been, for the most part, successful in all lines except one—the oil base gallon paint cans," he said.

Since complaints have been so numerous and widespread on this particular container, the Metal Can Branch decided that a study should be made to determine appropriate action to be taken on the problem.

In this respect, the National Association offered its services and made a survey among paint manufacturers to determine what was actually wrong with black plate cans. The survey revealed that cans rust during shipment from the can manufacturer and prior to filling. They continue to rust on the outside and in some cases on the inside after filling. Naturally paint manufacturers are worried that leaks may develop on dealers' shelves of slow-moving paint items.

The percentage of rusted cans and leakers varies somewhat, but average about 45 percent rusted, and 2 percent leakers. Badly rusted cans must be cleaned by hand or returned to the can manufacturer. Also, small amounts of rust spoil light-colored paints. Leakers are returned to manufacturers, or are scrapped. Any leaky cans not detected before filling result in a loss of critical paint materials.

Several complaints have also been received from paint manufacturers to the effect that lack of bails and ears on gallon oil base paint cans is causing considerable inconvenience to the consumer in handling of cans.

While the majority of paint can manufacturers state that the black plate can is inferior to the tin plate can, considerable progress has been made on the improvement of the black plate can. However, processing spoilage and operating costs are still problems to be overcome.

The problem of developing a lacquer that is resistant to a wide variety of chemicals found in paints was also presented. Trouble is being encountered with contamination of the paint as well as exploding of cans due to dissolving of the lacquer and chemical action of the paint ingredients on the lacquer.

Since NPA recognizes that the oil base paint can problem is a serious one, considerable effort is being made to provide paint manufacturers with a more satisfactory can for packaging of paint.

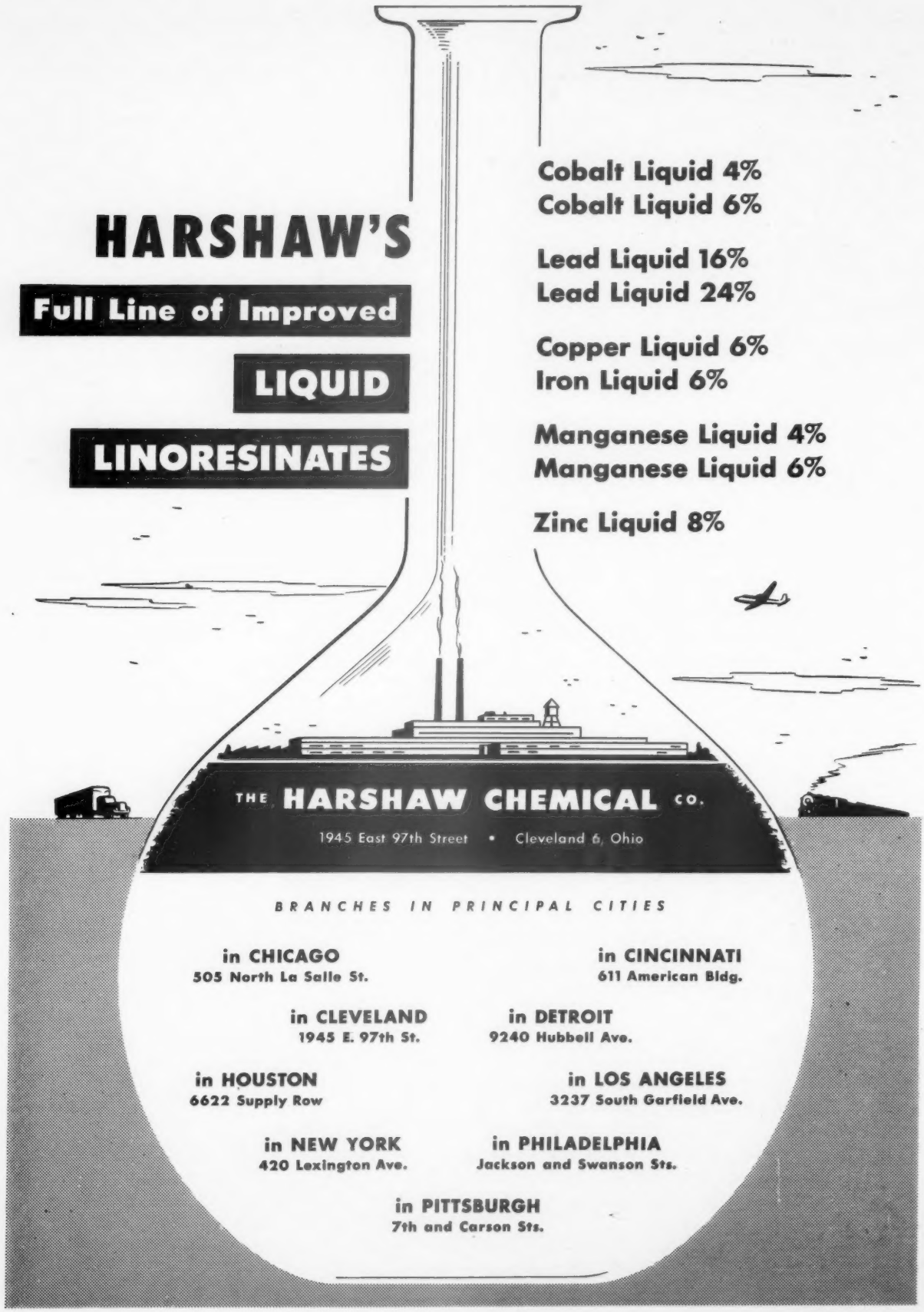
Seeing Is Believing

DESIGNED to reach housewives and other consumers, the Glidden Co. has recently sponsored a television program showing the qualities of "Spred Satin," latex emulsion coating.

This is the first in a series of demonstrations emphasizing the durability and other qualities of latex emulsion paint. Viewers saw a scrubbing machine scrub the paint in action similar to a laboratory test in which the surface was subjected to 40,000 scrubbing strokes. They also saw an unsupported strip of paint folded, crumpled, and pounded with a hammer. Other features such as ease of application and coverage were also demonstrated.

Aside from the most obvious purpose of such a program—advertising, these demonstrations will do much to acquaint the public with advancements that the paint industry is making today.

Reduced to simple terminology, the ordinary layman is able to understand that emulsion paints are different and have some very desirable qualities. He also becomes aware of the fact that paint manufacturers carry on extensive testing in order to assure the consumer that the products he buys will perform well. In essence, such a program brings the consumer right into the paint laboratory making him realize that from a technical standpoint the paint industry is moving ahead, thus producing better paint products all the time.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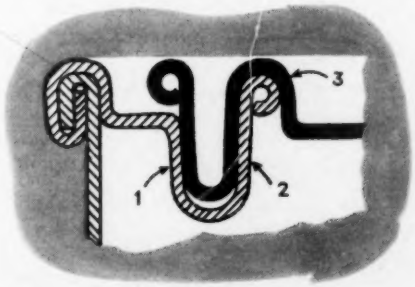

HERE'S THE SECRET of the "Tripletite" Can. Note that in the lid and lid seat, metal touches metal at three points instead of the usual two. Your product has 50% greater defense against oxidation and paint skin. The lid holds securely when applied at the factory and when re-closed by the user.

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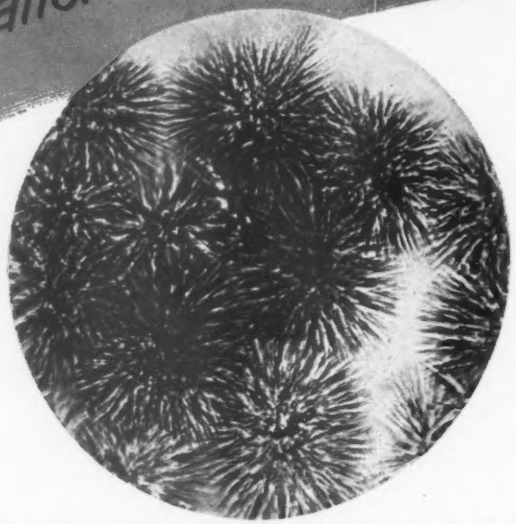
Better Paint Formulations with "LEAD"



The secret of the superiority of "lead" paints lies largely in the typical and unique lead-soap crystals shown here. Notice interlacing of the spiney appendages. This adhesive, cohesive, felted mat structure is responsible for many of the superior mechanical and chemical properties that lengthen the life of "lead" paints.

The characteristics of white lead in paints are unequivocably and demonstrably true. For the reasons listed below, "lead" gives you numerous end-use advantages . . . such as controlled oil-penetration, improved drying and controlled chalking characteristics, greater mildew resistance, and protection against erosion . . . adding up to better appearance and longer *effective* service life.

"LEAD" LENGTHENS THE LIFE OF PAINT BECAUSE

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It Stabilizes—neutralizes acidic compounds resulting from the decomposition of the vehicle—prevents the film from becoming soft or liquefying.

It Plasticizes—forms lead soaps which increase film flexibility.

It Strengthens—flexible, spiney crystals in lead soaps mechanically reinforce the film and increase elastic strength.

It Resists Water—paint films with an optimum lead pigment content absorb only a small fraction as much water as they otherwise would.

It Limits Oil Penetration — more of the vehicle remains in the film where it is needed; less is absorbed in the substrata.

It Improves Appearance — by controlling chalking and inhibiting mildew.

The reasons for including white lead in the formulation of mixed pigment house paints make equally good sense to the paint chemist and to sales management. Simplified, they are understandable —and highly *saleable*—to anyone who makes, sells, or uses paints.

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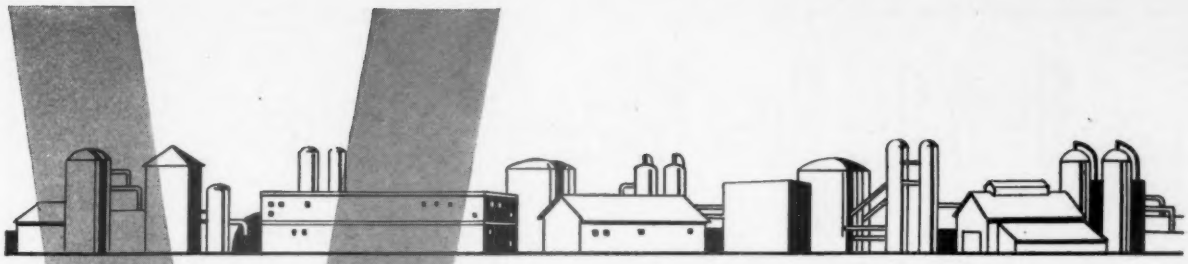

use

VELSICOL RESIN AD-21

1 **EXTEND** limited supplies of resins . . .

2 **REDUCE** raw material costs . . .

3 **RETAIN** desirable protective properties . . .

FORMULATION	25% REPLACEMENT	70% REPLACEMENT
Velsicol AD-21	25 Lbs.	70 Lbs.
100% Oil Soluble Phenolic	75 Lbs.	30 Lbs.
Chinawood Oil	280 Lbs.	100 Lbs.
Soybean Oil S-70	----------	100 Lbs.
Mineral Spirits	380 Lbs.	300 Lbs.
Driers	0.5% Lead, 0.03% Cobalt, 0.03% Manganese	0.5% Lead, 0.03% Cobalt, 0.03% Manganese
VEHICLE PROPERTIES:		
Gallon Length	35	25
Solids	50%	50%
Viscosity (Gardner-Holdt)	G+	G
Color (Gardner)	12-13	12-13
Set-To-Touch	15 Min.	30 Min.
Tack Free	2 Hours	6 Hours
Print Free	3 Hours	8 Hours
Dry Hard	5 Hours	18 Hours
Kauri Reduction	Passes 170% Fails 180%	Passes 80% Fails 90%
GAS PROOF TEST	Passes	Passes
WEATHEROMETER TEST	247 Hours	228 Hours
RESISTANCE TESTS:		
H_2O @ 77° F.	72 Hours—Film O.K.	72 Hours—Film O.K.
H_2O @ 212° F.	6 Hours—Film O.K.	5 Hours—Film O.K.

Prominent among the applications of Velsicol AD-21 is its use as an extender for 100% oil soluble phenolic resins. This type of application is capable of providing considerable saving in raw material costs, with resulting retention of desirable performance properties.

Data at the left represents two typical applications in which Velsicol AD-21 can be used as partial replacement of 100% oil soluble phenolic resins.

For additional data and information, request Velsicol Technical Bulletin No. 219.

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Fungal Requirements in Government Specifications

By

SAM RUGGERI
Alaka Research Laboratories Div.,
Lacquer and Chemical Corp.
Brooklyn, N. Y.

THE problems of deterioration due to fungi and moisture (for the presence of fungi indicates the presence of excessive moisture) have always been with us. However, it was not until World War II, when the action in the South Pacific dramatized these problems, that designers, manufacturers and users of materiel and equipment paid much attention to these agents of destruction.

In the "too little and too late" stage of the war, quite a bit of the material, equipment, clothing—just about everything—that went down to the South Pacific, either was supporting fungus growth by the time it got there or else was quickly covered with fungus growth on arriving there. Here was a formidable enemy which had to be contended with, in addition to the human enemy. The methods for coping with this problem will be discussed later, but first let us look briefly into the background of this problem.

The basic cause for this deterioration was the initial choice of materials since no particular attention was paid to the susceptibility of the materials, which were used, to fungi and moisture. It was not anticipated that the equipment would be called upon to perform under conditions of high humidity which, together with the ever present fungi spores, made equipment inoperative and materiel useless. Some deterioration of equipment by fungus has been encountered in the United States where, for instance, the equipment may have been stored in a poorly ventilated warehouse, but such instances have been rather rare and would not warrant making equipment resistant to fungi and high humidity.

The requirements were changed when the equipment was to be used in the tropics; hence the problem of deterioration by fungi. To analyze the general problem was relatively simple; to solve the detailed problems was not so simple; to solve the overall problem was impossible. The overall solution is still impossible hence the only approach is to tackle detailed problems.

Solutions

FOR electronic equipment the immediate solution during the war was to coat the entire piece of equipment with a suitable varnish or lacquer, into which was incorporated a fungistatic agent, so as to prevent the penetration of moisture into the components and which prevented the growth of fungi. As time went by, this approach became less important and the stress has been placed on the development and use of materials which are funginert (inherently fungus resistant) wherever possible. Where funginert materials are not available the only other alternative is to treat with fungistatic materials.

For other types of materials, such as textiles, threads, webbing, etc., the use of funginert materials (such as nylon) is being specified when possible. Some of the newer fibers are also funginert and will eventually be used to a greater degree. But in many cases fungus susceptible materials will continue to be used especially where production of funginert materials do not keep pace with demand. Also, for some materials, such as cork and leather, funginert replacements do not appear very likely. Thus, the use of susceptible materials, treated with fungistatic agents to render them resistant, will continue to be extensive.

In the early days of tropicalization, because of the urgency for upgrading existing materials and equipment and because of the lack of uniformity among the various branches of the Armed Services, there were numerous overlapping specifications for treating materiel to increase fungus resistance. Some of this overlapping still exists but it promises to diminish in time as the standardization program progresses. However no completely uniform set of specifications can be possible, since the requirements of the various branches are not alike. A rapid glance at the specifications listed in Table 1 will indicate

(*Turn to page 20*)

TABLE 1

Specifications which cover or include fungistatic formulations

SPEC.	VEHICLE	FUNGICIDE
FEDERAL SPECIFICATIONS		
O-L-164	Type I—Animal oil & solvents Type II—Optional	Type I—Paranitrophenol Type II—Optional except for mercury or halogen-containing fungicides which are prohibited
TT-W-531	———	Anthracene—Oil
TT-W-546	Water	Acid-Cupric-Chromite
TT-W-549	Water	Ammoniacal Copper Arsenite
TT-W-551	Dry or water	Chromated-Zinc-Chloride
TT-W-566a	———	Creosote-Coal-Tar
TT-W-568	———	Creosote-Petroleum
TT-W-570	None	Pentachlorophenol
TT-W-573	None	Wolman-Salt
TT-W-576a	None	Zinc-Chloride
TT-W-581	Acetic Acid	Zinc-Meta-Arsenite
MILITARY SPECIFICATIONS (INCLUDING JAN AND MIL)		
JAN-C-173 (Amend 1)	Varnish or Lacquer	Not Specified
MIL-V-173a (Proposed)	Para-phenyl-phenolic Tung Oil Varnish	Salicylanilide
JAN-G-475	Solvent or 2-bath aqueous solution,and Coating	Dihydroxy-dichloro-diphenyl-methane and Pentachlorphenol
JAN-T-505	Not Specified	Zinc Naphthenate
JAN-D-570	Not Specified	Zinc Naphthenate
JAN-P-629	Oil-type Wood Primer	Phenyl Mercuric Salicylate or Phenyl Mercuric Acetate or Phenyl Mercuric Hydroxide
JAN-P-630	Oil-type Camouflage Paint	Same as in JAN-P-629
JAN-M-868 (Amend 1)	Not Specified	Zinc Naphthenate
JAN-T-713 (Amend 1)	Microcrystalline Wax containing maximum of 10% beeswax	Not Specified
JAN-C-764	Not Specified	Zinc Naphthenate
MIL-W-906	Not Specified	Type A—Copper Naphthenate Type B—Chlorinated Phenols Type C—Phenyl Mercuric Oleate
MIL-T-945A	Paraffin Wax Solution	Salicylanilide
MIL-W-956 (BuOrd)	Microcrystalline Wax	Phenyl Mercuric Stearate
JAN-V-1137	Various electrical insulating varnishes	None Used
MIL-H-1965	Suitable polymer of Vinyl Chloride or Vinly Chloride/Vinyl Acetate Copolymer	Not Specified
MIL-M-2312	Not Specified	Either 2,2′ dihydroxy-5,5′ dichloro-diphenyl methane or Salicylanilide
MIL-W-3093	Cellulose Acetate Lacquer	Salicylanilide or Pentachlorophenol
MIL-F-4143 (USAF)	Not Specified	Copper-8-hydroxy quinoline
MIL-M-5658	Not Specified	Copper-8-quinolinolate
MIL-L-10095 (QMC)	Type I—Sulphonated Cod or Neat's foot Oil Type II—Solvent Mixture	Paranitrophenol for both types
MIL-W-10828 (QMC)	(a) 2-bath water process (b) Solvent or Emulsion	(a) Cupric salt plus 8 hydroxy quinoline (b) Copper-8-hydroxy-quinolinolate
MIL-D-10860 (QMC)	Not Specified	Type (a) Copper-8-quinolinolate Type (b) Copper Naphthenate and Copper-8-quinolinolate Type (c) Copper Hydroxy Naphthenate and Copper-8-quinolinolate
MIL-C-15050 (BuOrd)	Not Specified	Copper-8-quinolinolate
MIL-C-15159 (Ships)	Not Specified	Not Specified
MIL-T-16070 (Ships)	Not Specified	Type (I) Copper-8-quinolinolate Type (II) Copper Naphthenate and Dihydroxy-dichlorodiphenyl methane
NAVY DEPARTMENT SPECIFICATIONS		
Bureau of Ordnance Specifications		
52L20 (Ord)	Ethyl Cellulose Lacquer	Class S—Salicylanilide Class MS—Salicylanilide and Phenyl Mercuric Ortho Benzoic Sulfimide
52L21 (Ord)	Cellulose Ester Lacquer	Class S—Salicylanilide Class MS—Salicylanilide and Phenyl Mercuric Ortho Benzoic Sulfimide
52V23 (Ord)	Para Phenyl Phenol Tung Oil Varnish	Class S—Salicylanilide Class MS—Salicylanilide and Phenyl Mercuric Ortho Benzoic Sulfimide
52V24 (Ord)	Melamine Alkyd Varnish	Class M—Phenyl Mercuric Ortho Benzoic Sulfimide
52W7 (Ord)	Paraffin Wax Solution	Class S—Salicylanilide Class MS—Salicylanilide and Phenyl Mercuric Ortho Benzoic Sulfimide
DEPARTMENT OF THE ARMY SPECIFICATIONS		
3-186	Type I—Linseed Oil Base Type II—Alkyd Resin Base Type III—Oil And/Or Resin Base	Pentachlorophenol or Phenyl Mercuric Oleate or Salicylanilide
3-189A	Type I—Powder Type II—Paste Type III—Liquid	Sodium salt of Pentachlorophenol
3-190A	Gilsonite and Solvents	Pentachlorophenol
3-202	Linseed Oil and Solvents	Phenyl Mercuric Oleate or Pentachlorophenol
3-210	Para Phenyl Phenol Tung Oil Varnish	Salicylanilide
4-1131A	Type I—Solvent, pigmented Type II—Solvent, clear Type III—Emulsion, clear	Not Specified
6-186A	Not Specified	Dihydroxy-dichloro-diphenyl methane
6-187A	Not Specified	Dihydroxy-dichloro-diphenyl methane
6-377	Not Specified	Dihydroxy-dichloro-diphenyl methane
9-100	Oils and Solvents	Paranitrophenol or Paranitrophenol plus pentachloride
15-3-B (Amend 1)	Microcrystalline Wax containing Maximum of 10% Beeswax	Not Specified
47-61A	Not Specified	Zinc Naphthenate
91-120	Non-conducting compound	Salicylanilide
100-17	Not Specified	Type I—Copper Naphthenate Type II—Cuprammonium Type III—Copper Ammonium Fluoride
Army Ordnance Department Tentative Specifications		
AXS-1244	Solvent	Copper Naphthenate
AXS-1247	Type I—Solvent Type II—Not Specified Type III—Not Specified	Type I—Copper Naphthenate Type II—Dihydroxy-dichlorodiphenyl methane Type III—Salicylanilide
AXS-1296	Solvent	Zinc Naphthenate
Corps of Engineers Tentative Specifications		
T-1279D	Oleoresinous Camouflage Paint	Not Specified
T-2278	Method I—Organic Solvent Method II—Ethyl Cellulose Lacquer Method III—Organic Solvent Method IV—Ethyl Cellulose Lacquer	Phenyl Mercuric Oleate Phenyl Mercuric Oleate Pyridyl Mercuric Chloride Pyridyl Mercuric Chloride
Frankford Arsenal Tentative Specification		
FXS-934 (Amend 1)	Nitrocellulose Lacquer	Salicylanilide
Signal Corps Tentative Specification		
71-3179	Paraffin Wax Solution	Salicylanilide
DEPARTMENT OF THE AIR FORCE SPECIFICATIONS		
14141	Fenetrating Solution	Pentachlorophenol or a mixture of Pentachlorophenol,tetrachlorophenol, and 2-chlororthophenyl phenol
14155	Water	One of the following: (1) Sodium pentachlorophenate (2) Sodium tetrachlorophenate (3) Sodium pentachlorophenate and commercial borax (4) Sodium pentachlorophenate and commercial borax (5) Sodium pentachlorophenate, ethyl mercuric phosphate and commercial borax (6) Ethyl mercuric phosphate
14160 (Amend 1)	Vegetable oils orsynthetic resins, organic acids, and solvent	Copper-Zinc-8-quinolinolate

TABLE 2

Specifications which include methods for testing for Fungus Resistance

SPEC.	TEST FUNGI	TYPE OF TEST	MATERIAL TESTED
FEDERAL SPECIFICATIONS			
O-L-164	None	Chemical	Leather Dressing
T-R-592 (Amend 1)	*Chaetomium globosum*	Culture	Treated Rope
KK-L-311 (Amend 3)	(1)— *Aspergillus niger* TC215-4247 or ATCC 6275	Culture	Treated Leather
	(2)— Fungi-spore mixture in sand	Tropical Exposure	Treated Leather
	(3)— *Metarrhizium glutinosum* 1334.2 and *Aspergillus ustus* J-272	Culture	Treated Leather
TT-P-18	*Aspergillus niger*	Culture	Dried Casein Paint Film
TT-P-22	*Aspergillus niger*	Culture	Dried Casein Paint Film
TT-W-570	None	Chemical	Pentachloro-phenol
CCC-T-191 (Amend 2) Supplement	(1a)— *Chaetomium globosum* 1042.4 or ATCC 6205	Culture	Textiles
	(1b)— *Metarrhizium glutinosum* USDA 1334.2 or ATCC 9095	Culture	Textiles
	(2)— *Aspergillus niger*	Culture	Textiles
	(3)— *Metarrhizium glutinosum* USDA 1334.2 and *Aspergillus ustus* J D strain J-272	Soil Burial	Cloth, Webbing, Rope, Thread
MILITARY SPECIFICATIONS (INCLUDING JAN AND MIL)			
JAN-C-76 (Amend 4)	None	Chemical	Braid-covered Wire
JAN-C-173 (Amend 1)	*Aspergillus niger* ATCC 9642 *Aspergillus flavus* ATCC 9643 *Penicillium luteum* ATCC 9644 *Trichoderma T-1* ATCC 9645	Culture	Dried varnish or Lacquer Film
MIL-V-173A (Proposed)	Same as in JAN-C-173 and/or None	Culture and/or Chemical	Dried varnish film
JAN-D-504	*Chaetomium globosum* USDA 1042.4 or *Myrothecium verrucaria* USDA 1334.2 or *Stemphylium Sp.* USDA 1203.1 and *Aspergillus niger* USDA #TC 215-4247	Culture	Cotton duck and twill
JAN-P-629	*Aspergillus aryzae* ATCC #10,196 and *Penicillium citrinum* ATCC #9,849	Culture	Wood Primer (Oil-Type)
JAN-P-630	Same as in JAN-P-629	Culture	Camouflaging Paint (Oil-Type)
MIL-I-631A	Same as in JAN-C-173	Culture test for Fungi-nertness	Electrical Insulation
JAN-T-945A	Same as in JAN-C-173	Tropical Exposure	Completed Test Set
MIL-W-956 (BuOrd)	Same as in JAN-C-173	Culture	Fungistatic Wax
MIL-B-1960	*Chaetomium globosum*	Culture	Treated cotton, duck, thread and webbing
MIL-H-1965	*Chaetomium globosum*	Culture	Coated, Treated or Untreated cotton fabric
MIL-M-2312	*Aspergillus niger* USDA 2154-247 (ATC #6275) *Penicillium Sp.* USDA 1336.2 (ATC #9112) *Metarrhizium glutinosum* USDA 1334.2 (ATC #9095)	Culture	Treated Felt
MIL-L-5003	As least 5 fungi; One from each group: Group I— *Chaetomium globosum* USDA 1042.2 or *Myrothecium verrucaria* USDA 1334.2 Group II— *Rhizopus nigricans* S N 32 or *Aspergillus niger* USDA TC215-4247 Group III— *Aspergillus flavus* Amc No. 26 or *Aspergillus terreus* PQMD 82J Group IV— *Penicillium luteum* USDA 1336.1 *Penicillium Sp.* USDA 1336.2 or *Penicillium citrinum* ATCC 9848 Group V— *Memnoniella echinata* AMC No.37 or *Fusarium moniliforme* USDA 1004.1	Tropical Exposure	Completed Lamp Assembly
MIL-C-5026 (Amend 1)	*Chaetomium globosum* USDA 1042.4 *Aspergillus terreus* PQMD 82J *Penicillium citrinum* ATCC 9849 *Aspergillus niger* USDA TC215-4247 *Fusarium moniliforme* USDA 1004.1 *Myrothecium verrucaria* USDA 1334.2	Tropical Exposure	Completed Cutout Assembly
MIL-E-5272 (USAF)	Same as in MIL-L-5003	Tropical Exposure	Completed electronic and related Equipment
MIL-M-5658	*Chaetomium globosum* USDA 1042.4 or ATCC 6205 *Myrothecium verrucaria* USDA 1334.2 or ATCC 9095 *Aspergillus terreus* PQMD 82J	Culture	Treated Fabric, Cordage or Threads
MIL-F-10090 (QMC)	*Aspergillus niger* USDA TC 215-4247 or ATTCC 6275 *Aspergillus flavus* ATTCC 1003 *Penicillium Sp.* USDA 1336.2	Culture	Glue
MIL-F-10091 (QMC)	Same as in MIL-F-10090 (QMC)	Culture	Glue
MIL-L-10095 (QMC)	None	Chemical	Leather Dressing
MIL-C-15050 (BuOrd)	Forms of microbial life that decompose cellulose	Soil Burial	Treated Canvas
NAVY DEPARTMENT SPECIFICATIONS			
17-I-34	*Aspergillus niger* ATCC 9642 *Aspergillus flavus* ATCC 9643 *Penicillium luteum* ATCC 9644 *Trichoderma T-1* ATCC 9645	Culture	Electrical Insulation
17-I-46 (Amend 1)	Same as in 17-I-34	Culture	Electrical Insulation

(Continued Next Page)

TABLE 2 (Cont.)

SPEC.	TEST FUNGI	TYPE OF TEST	MATERIAL TESTED
	Bureau of Aeronautics Specification		
17F19(Aer) (Amend 1)	One from each of the following four groups: Group I (Cellulose present) — *Chaetomium globosum* USDA 1042.4 or *Metarrhizium glutinosum* USDA 1334.2 Group I (Cellulose absent — *Rhizopus nigricans* S N 32 or *Aspergillus niger* USDA Tc 215-4247 Group II— *Aspergillus flavus* AML #15 or *Aspergillus flavus* S N 3 or *Aspergillus ustus* JQD J272 Group III— *Penicillium luteum* USDA 1336.1 or *Penicillium luteum* SW 41 or *Penicillium sp.* USDA 1336.2 or *Penicillium sp.* SN 40 Group IV— *Memnoniella echinata* SN 2 or *Fusarium moniliforme* USDA 1004.1 or *Trichoderma* USDA T-1	Tropical Exposure	Electrical Equipment
	Bureau of Ordnance Specifications		
52L20(Ord)	*Aspergillus niger* ATCC 9642 *Aspergillus flavus* ATCC 9643 *Penicillium luteum* ATCC 9644 *Trichoderma T-1* ATCC 9645	Culture	Fungistatic Lacquer Film
52L21(Ord)	Same as in 52L20(Ord)	Culture	Fungistatic Lacquer Film
52T15(Ord)	Same as in 52L20(Ord)	Tropical Exposure test for Fungineertness; Culture test for Fungistatic Effectiveness	Electrical and Electronics Elements, Components & Assemblies
52V23(Ord)	Same as in 52L20(Ord)	Culture	Fungistatic Varnish Film
52V24(Ord)	Same as in 52L20(Ord)	Culture	Fungistatic Varnish Film
52W7(Ord)	Same as in 52L20(Ord)	Culture	Fungistatic Wax Film
	Bureau of Ships Specifications		
Appendix IX to General Specification for Inspection of Material	*Chaetomium globosum* *Metarrhizium glutinosum* *Trichoderma lignorum* *Memnoniella echinata* *Aspergillus niger* *Penicillium fuscoglaucum* *Aspergillus clavatus*	Culture	Textiles also for: Leather Fiber Rubber Resins Cork Paper products
	DEPARTMENT OF THE ARMY SPECIFICATIONS		
3-186	*Aspergillus niger* *Chaetomium globosum*	Culture	Plywood dipped in wood sealer
3-189A	None	Chemical	Stain
3-190A	None	Chemical	Stain
3-210	*Aspergillus niger* USDA 6275 *Penicillium citrinum* ATCC 9849	Culture	Dried Varnish Film
6-377	*Aspergillus niger*	Tropical Exposure	Treated Felt
60-977-2	Same as in 3-210	Culture	Electrical Components
100-17	*Chaetomium globosum*	Culture	Treated Fabric Cordage and Threads
	Army Ordnance Department Tentative Specifications		
AXS-992	*Chaetomium globosum* USDA 1042.2 or *Metarrhizium Sp.* USDA 1334.2 or *Stemphylium sp.* USDA 1203.1 and *Aspergillus niger* USDA 215-4247	Culture	Artificial Leather
AXS-1244	*Chaetomium globosum* USDA 1042.2 or *Stemphylium sp.* USDA 1203.1	Culture	Treated cordage and Thread
AXS-1247	Same as in AXS-992	Culture	Treated cotton duck, webbing, belting & thread
AXS-1296	Forms of microbial life that decompose cellulose	Soil Burial	Treated webbing & thread
	Chemical Warfare Service Tentative Specification		
197-54-394A	*Aspergillus niger* and *Chaetomium globosum*	Culture	Fabrics, tape, webbing, thread, cordage
	Corps of Engineers Tentative Specification		
T-2278	*Aspergillus niger*	Culture	Treated Cork
	Signal Corps Tentative Specificatin		
72-95 (Amend 1)	*Aspergillus niger* #6277	Culture	Fungistatic hot melt
	DEPARTMENT OF THE AIR FORCE		
7183	*Penicillium luteum* *Aspergillus niger* *Aspergillus flavus* *Trichoderma lignorum*	Tropical Exposure	Junction Box
14160 (Amend 1)	*Chaetomium globosum* USDA 1042.4 or ATCC 6205 *Myrothecium verrucaria* USDA 1334.2 or ATCC 9095 *Aspergillus terreus* PQMD 82J	Culture	Treated Material
16159	Forms of microbial life that decompose cellulose	Soil Burial	Treated Cotton Cloth
16166	Same as in 16159	Soil Burial	Treated Cotton Cloth
41065B (Amend 2) (Notice 1)	Method 71: *Chaetomium globosum* USDA 1042.4 *Aspergillus terreus* PQMD 82J *Penicillium citrinum* ATCC 9849 *Aspergillus niger* USDA—TC 215-4247 *Fusarium moniliforme* USDA 1004.1 *Myrothecium verrucaria* USDA 1334.2 Method 72: At least 5 fungi, one from each group: Groups same as used in MIL-E-5272(USAF)	Tropical Exposure Tropical Exposure	Electrical & Electronic Equipment Electrical & Electronic Equipment

VIII. Additions to Table 2:

Add to list of MILITARY SPECIFICATIONS:

MIL-W-5086	Chaetomium globosum USDA 1042.4 Aspergillus terreus PQMD 82J Penicillium-citrinum ATTC 9849 Aspergillus niger USDA-TC 215-4247 Fusarium moniliforme USDA 1004.1 Myrothecium verrucaria USDA 1334.2	Tropical Exposure	Electrical Wire
MIL-T-5091 (Aer)	1 from each of the following 4 groups: (See 17F19 (Aer))	Tropical Exposure	Completed Equipment

the diverse types of materials (vehicles and fungicides) which are specified in various government specifications and used to treat materiel and equipment. The scope of this paper does not include a discussion as to the relative merits of one material as against another.

Testing and Exposure

CLOSELY related to the large number of treating materials specified, is the large number of test methods which are used for determining resistance to fungus growth. One question which enters into the testing for fungus resistance is which fungi to use in the test since there are literally thousands of strains of fungi which could be considered in this question of fungus resistance.

Another question is that of what type of exposure or incubation to use after the test specimen has been inoculated with the test fungi. The various methods can be classified into three types:

(a) Culture test—where a known additional source of nutrient is supplied (usually depends on a visual growth evaluation)

(b) Tropical Exposure test—where no additional source of nutrient is supplied (can be either visual growth or performance evaluation)

(c) Soil Burial test—(usually a performance evaluation). Table 2 highlights the various methods of testing for fungus resistance as specified in government specifications.

Up until recently no attempt was made to differentiate between fungus resistance due to lack of nutrients for fungi (funginertness) and fungus resistance due to the incorporation of fungistatic agents. This distinction is important since the former represents resistance over a long period of time while the latter is resistant only for a short period of time after which the treated material is likely to be inferior to untreated material. Two methods for the determination of funginertness of materials have been incorporated into government specifications; one being a culture test and the other a tropical exposure test (both rely on visual evaluation). Both methods are still being studied to establish their validity and reproducibility and are subject to revision after further laboratory work.

At the start of this year, the *Alaka Research Laboratories* were contracted by the Bureau of Ordnance, Department of the Navy, to conduct research and development in the field of tropical deterioration. One object of this program is to determine which materials are funginert. This is being done through the use of two test methods for determining funginertness, as mentioned above, and by developing a suitable test to determine funginertness.

Another phase of this work relates to the various aspects of tropicalization as they relate to government specifications. Hence, we have compiled an extensive library of government specifications. This library has been drawn upon for many of the specifications cited in this paper. The list found at the end of this paper cannot hope to be complete since changes are made in the specifications from day to day. When sufficient additional listings have been accumulated we plan to supplement and revise this list from time to time.

The listing has been divided into three parts. Part 1 (Table 1) lists those specifications which cover or include fungistic formulations for use in increasing the resistance of materiel to fungus growth. This table includes the specification number, the vehicle for the fungicide and the fungistatic agent.

Part 2 (Table 2) lists those specifications which include test methods for determining fungus resistance. In this table are found listed the test fungi, type of test and the material which is tested for the various specifications.

Part 3 contains a general list of specifications which relate to the problems of deterioration by fungus. This list includes specifications which require fungus resistance without necessarily specifying how this resistance is to be achieved. Some of the specifications call for the use of funginert materials wherever possible. Some of the specifications include treatment for increasing fungus resistance without specifying the material except by referring to another specification and without specifying any test to check the effectiveness of the treatment. Of necessity, this list is much more extensive than either table 1 or table 2.

SPECIFICATIONS RELATED TO FUNGUS DETERIORATION

LEGEND FOR SYMBOLS FOLLOWING EACH OF THE SPECIFICATIONS:

F—Specification calls for use of funginert materials.

M—Specification covers or includes a fungistatic formulation for use to treat fungus susceptible materials and equipment.

R—Specification calls for fungus resistance without giving any details as to how this resistance is achieved.

T—Specification calls for a treatment to increase fungus resistance.

*—Specification includes a method for testing for fungus resistance.

**—Specification refers to some other specification for method for testing for fungus resistance.

FEDERAL SPECIFICATIONS

C-F-206 T
Felt, Mechanical, Roll.

O-L-164 M, *
Leather Dressing; Mildew-Preventive.

T-R-592, Amend. 1. T, *
Rope, Jute.

T-T-871a T, **
Twine, Cotton, Wrapping.

V-F-106 T, **
Fasteners, Slide; Interlocking.

CC-M-636, Amend. 2. T
Motors; Alternating-Current, Fractional-Horsepower, Single-Phase and Universal.

KK-L-311, Amend. 3. *
Leather and Leather Products; General Specifications (Methods of Sampling, Inspection, and Tests)

TT-P-18 R, *
Paint; Alkyd Resin-Emulsion, Exterior, Paste, Tints and White.

TT-P-22 R, *
Paint; Cold-Water, Exterior, Powder (With Mixing Liquid).

TT-W-531 M
Wood-Preservative; Anthracene-Oil (For) Brush, Spray, or Open-Tank Treatment.

TT-W-546 M
Wood-Preservative; Celcure (Acid-Cupric-Chromate).

TT-W-549 M
Wood-Preservative; Chemonite (Ammoniacal Copper Arsenite).

TT-W-551 M
Wood-Preservative; Chromated-Zinc-Chloride.

TT-W-566a M
Wood-Preservative; Creosote-Coal-Tar-Solution.

TT-W-568 M
Wood Preservative; Creosote-Petroleum-Solution.

TT-W-570 M, *
Wood-Preservative; Pentachlorophenol.

TT-W-571c T
Wood-Preservative; Recommended Treating Practice.

TT-W-573 M
Wood-Preservative; Wolman-Salt (Tanalith).

TT-W-576a M
Wood-Preservative; Zinc-Chloride.

TT-W-581 M
Wood-Preservative; Zinc-Meta-Arsenite (ZMA).

CCC-T-191a, Amend. 2, and Supplement *
Textiles; General Specifications, Test Methods.

MILITARY SPECIFICATIONS (JAN AND MIL)

JAN-P-13, Amend. 4. R
Plastic-Materials, Laminated Thermo-Setting Sheets and Plates.

JAN-C-76, Amend. 4. T, *
Cable (Hook-Up Wire), Electric, Insulated, Radio and Instrument.

JAN-P-77, Amend. 1. R
Plastic-Materials, Cast, Thermosetting.

JAN-T-152 T
Treatment, Moisture- And Fungus-Resistant, of Communications, Electronic, And Associated Electrical Equipment: General Process For.

JAN-C-173, Amend. 1. M, *
Coating-Materials, Moisture- And Fungus-Resistant, for the Treatment of Communications, Electronic, and Associated Electrical Equipment.

MIL-V-173A (Proposed) M, *
Varnish, Moisture- And Fungus-Resistant, for the Treatment of Communications, Electronic, and Associated Electrical Equipment.

JAN-A-188, Amend. 1. R
Alidades, Telescopic (Shipboard Use).

JAN-P-245 R
Projectors (for Slides and Slide Films).

JAN-C-250 R
Contact-Printers, Photographic.

JAN-G-252A T, **
Goggles, Variable-Density (For Lookouts).

JAN-S-258, Amend. 2. T, **
Screen, Projection (Mounted on Springless Rollers, Rope-and-Pulley Operated).

JAN-S-259, Amend. 2. T, **
Screen, Projection (Mounted on Spring Rollers).

JAN-S-260, Amend. 2. T, **
Screen, Projection, Folding, (For Portable-Frame-Mounting).

JAN-S-261, Amend. 2. T, **
Screen, Projection (For Auditorium-Frame Mounting).

JAN-C-307, Amend. 2. T
Cases, Shipping, 16-mm Motion-Picture Safety Film).

JAN-C-308, Amend. 1. T
Cases, Shipping, 35-mm, Motion-Picture Safety Film).

JAN-F-335 T
Finishers, Asphalt, Crawler-Mounted, Gasoline-Driven.

MIL-C-342A T, **
Cloth, Cotton, Wind Resistant, Twill and Poplin.

MIL-M-375A T
Mixer, Asphalt, Diesel-Engine-Driven, 110 to 200 Tons per Hour.

JAN-C-392A T
Conveyor, Belt, Transfer, Gasoline-Engine-Driven, 24-in. by 57-ft.

JAN-D-393A T
Driers, Aggregate, Single-Drum, Diesel-Driven.

JAN-H-395 T
Heaters, Asphalt, Trailer-Mounted, 3-Car. 42-HP Boiler.

JAN-L-403 T
Loaders, Aggregate, Bucket, Gasoline-Driven, General Purpose.

JAN-K-410 T
Kettles, Asphalt, Skid-Mounted, 750-Gallon.

JAN-T-436A T
Tank, Asphalt, Steel, Trailer-Mounted, 1500-Gallon.

JAN-B-452, Amend. 1. T
Boiler-Plant Equipment, for Theaters of Operations.

JAN-P-469A T
Pumps, Water, Gasoline Driven, Trailer-Mounted With Distributor Attachments.

JAN-G-475 T, M, **
Glasses, Sun, With Case.

JAN-H-481 T
Hoists, Gasoline-Driven, Double-Drum, 1¾-Ton Pull, With Boom Swinger.

JAN-F-482 T
Fire-Engines, Chemical, Foam-Type.

JAN-C-485 T, **
Cloth, Cotton, Sheeting.

JAN-D-497 T
Ditching-Machine, Wheel-Type, Crawler-Mounted, Gasoline-Engine-Driven.

JAN-S-503 T
Sirens, Electric, 2 to 5 HP.

JAN-D-504 T, *, **
Dying and Aftertreating Processes for Cotton Duck and Twill.

JAN-T-505 T, M
Tank, Water, Steel, Semitrailer-Mounted.

JAN-P-509 T
Pump, Diaphragm, Gasoline-Engine-Driven, Pushcart-Mounted.

JAN-A-516A T
Auger, Earth, Skid-Mounted, Gasoline-Engine-Driven.

JAN-C-517, Amend. 1. T, **
Cloth, Label, Cotton, Permanent-Coated.

JAN-W-530, Amend. 1. T, **
Webbing, Cotton, Natural or in Colors.

JAN-N-533A R
Nets, Tennis.

JAN-S-546 T
Spreaders, Sand.

JAN-C-554 T
Coil-Winding Machines, Motor-Driven.

JAN-C-555 T
Compressors, Air, Diesel-Engine-Driven.

JAN-D-570 T, M
Distillation Unit, Diesel-Engine-Driven, Skid-Mounted, Thermo-Compression Type, 300 Gallons per Hour.

JAN-D-575A T
Distributors, Bituminous-Material; Truck-Mounted and Trailer-Mounted.

JAN-G-578 T
Graders, Road, Towed-Type, Leaning Wheel.

JAN-F-580 T
Fire-Trailer, Pumper, 2-Wheel.

JAN-P-581 T
Pump, Deep-Well, Turbine Type, Gasoline-Engine-Driven, 200 G.P.M. at 200-foot head.

JAN-T-594 T
Testers (Growlers), Armature-and-Stator.

JAN-P-600 T
Pump, Centrifugal, Gasoline-Engine-Driven, 55 G.P.M. at 50-ft. Head.

JAN-P-629 M, *
Primer, Oil-Type, for Wood (For Use with Camouflage Paint).

JAN-P-630 M, *
Paint, Oil-Type, Ready-Mixed (For Camouflaging).

JAN-I-631A R, *
Insulation, Electrical, Synthetic-Resin Composition, Nonrigid.

JAN-D-633 T
Ditching Machine, Ladder-Type, Crawler-Mounted, Gasoline-Engine-Driven.

JAN-G-635 T, **
Goggles, General-Purpose and Flight.

JAN-M-686, Amend. 1. T, M
Mixers, Concrete, Gasoline-Engine-Driven, Trailer-Mounted.

JAN-K-687 T
Kettles, Asphalt, Trailer-Mounted, 165-Gallon Capacity.

JAN-H-694 T
Hoist, Diesel-Driven, 2-Drum, 5.9-Ton Pull, With Boom Swinger.

JAN-T-713, Amend. 1. T, M, **
Twine, Lacing and Tying, Electrical and Electronic Equipment.

JAN-L-714, Amend. 1. T, **
Legging, Canvas.

JAN-R-727 T, **
Roll, Bedding, Waterproofed.

JAN-C-729, Amend. 1. T, **
Carrier, Wire Cutter, M-1938.

JAN-P-734A T
Paving-Breaker, Gasoline-Powered, Self-Contained.

JAN-C-764 T, M
Crushing-And-Screening-Plant, Two-Unit, Gasoline-Engine-Driven, Semitrailer-Mounted.

JAN-C-765 T, **
Camouflage-Cloth, Impregnated, Flame-Resistant.

JAN-G-804 T
Graders, Road, Motorized, Diesel-Driven.

MIL-B-829A T, **
Bags, Duffel.

MIL-M-864A T, **
Motor-Generators, D.C. to A.C. (Electronics Applications; Naval Shipboard and Shore).

MIL-A-898A T
Applicator, Fog, Insecticidal.

MIL-W-906 M
Wood Preservative, Water Repellent.

MIL-M-911A T
Mixers, Concrete, Gasoline-Engine-Driven (For Motor-Truck-Mounting).

MIL-E-917A (Ships) R, T
Equipment, Electric Power, Basic Requirement For (Naval Shipboard Use).

MIL-T-945A F, T, M, *, **
Test-Equipment, For Use With Electronic Equipment: General Specification.

MIL-W-956 (BuOrd) M, *
Wax, Fungus-Resistant.

MIL-I-983 (Ships), Amend. 2. F, T
Interior Communication Equipment, General Specification For.

MIL-B-1107A T, **
Belt, Pistol or Revolver, M-1936.
MIL-T-1108A T, **
Tent, Fire, Water, Weather, And Mildew-Resistant, Wall, Large, O.D.
MIL-T-1109A T, **
Tent, Fire, Water, Weather, And Mildew-Resistant, Wall, Small, O.D.
JAN-T-1110 T
Tent (Fire-and-Mildew-Resistant) Assembly, M-1942, O.D.
JAN-T-1111 T
Tent, Fire-and-Mildew-Resistant, Command Post, M-1945, O.D. Complete, with-Liner-And-Curtain.
JAN-V-1137 M
Varnish, Insulating (Electrical).
MIL-S-1216A F, T
Straighteners, Photographic Print.
MIL-B-1290 T
Bags, Canvas, Coal, 1-Bushel and 2-Bushel.
MIL-B-1291A T, **
Bag, Canvas, Tools and Maintenance Parts, Stove, Cooking, Outfits.
MIL-F-1437A T, **
Fly, Fire, Water, Weather, and Mildew Resistant, Tent, Squad, O.D.
MIL-B-1591 T
Bag, Canvas, Water-Carrying, 5-Gallons, Complete.
MIL-S-1698A T, **
Strap, Carrying, General Purpose.
MIL-T-1712 T
Tent, Fire-and-Mildew-Resistant, Squad, M-1945, O.D., 6-Foot, 2-Inch-Door.
MIL-B-1960 T, *
Bag, Waterproof, Special Purpose.
MIL-H-1965 T, M, *
Hammock, Jungle, Complete.
MIL-F-2066 T
Flies, Fire-And-Mildew-Resistant, Tent, (Army).
MIL-C-2221 T
Covers, Canvas, Machinery Trailer with Equipment and Oven for Mobile Bakery, M-1945.
MIL-S-2277 T
Screen, Latrine, Fire, Weather, Water and Mildew Resistant, O.D.
MIL-M-2312 T, M, *
Mildew Resistance and Moisture Resistance Treatment for Felt, Wool, (Army).
MIL-P-3086 R
Plastic Material, Thermoplastic, Non-Rigid, Polyamide Resin.
MIL-W-3093 T, M, **
Wire, Insulated, W-121, W-122, W-123, WD-15/U, WD-16, WF-9/U, and WT-3/U.
MIL-C-3162, Amend. 1. T, **
Cable; Ignition, High-Tension.
MIL-T-3509 T, **
Treatment; Fire, Water and Mildew-Resistant (For Tent Liner Fabrics).
MIL-F-4143 (USAF), Amend. 1. T, M, **
Fabric, Waterproofed.
MIL-L-5003 R, *
Lamp Assembly; Floodlight, Tripod Mounted, Four 150-Watt Projector Lamps.
MIL-I-5016 (Aer), Amend. 1. F, T
Indicators; Temperature, Thermocouple, Chromel-Alumel, Dual, 0 to 1000° C.
MIL-V-5019 (Aer) F, T
Valve; Pressure Regulating, Turn & Bank Indicator.
MIL-C-5026, Amend. 1. R, *
Cutout; Reverse Current, 24-Volt DC System.
MIL-F-5030 T, *
Felt; Hair.
MIL-C-5033A F, T
Clock; Aircraft, Civil Date, 24-Hour Dial, 2¾-Inch Diameter.
MIL-E-5272 (USAF) *
Environmental Testing, Aeronautical and Associated Equipment, (General Specification For).
MIL-M-5658 T, M, *
Mildew-Proofing of Fabrics, Threads and Cordages; Copper Process For.
MIL-I-6048 (Aer) F, T
Intercommunication-Sets, AN/AIC-5A and AN/AIC-5B.
MIL-T-10069 (QMC) T, **
Tent, Fire and Mildew Resistant, Maintenance Shelter (Tent Only), with Cover.
MIL-F-10090 (QMC) R, *
Furniture, Wood, Tables, For Officers' and Non-Comissioned Officers' Quarters, M-1948.
MIL-F-10091 (QMC) R, *
Furniture, Wood, Chairs, for Officers' and Non-Comissioned Officers' Quarters, M-1948.
MIL-L-10095 (QMC) M, *
Leather Dressing, Preservative and Mildew Preventative.
MIL-T-10168A (QMC) T, **
Tent, Frame-Type, Insulated, Sectional, With Foor, 16′ × 16′, M-1848, Complete.
MIL-P-10404 (QMC) T, **
Paulins, Canvas, Fire, Water, Weather, and Mildew-Resistant, O.D.
MIL-T-10513 (Sig C) T
Tropicalization of Materials Used in Signal Corps Equipment.
MIL-W-10828 (QMC) T, M, **
Webbing, Cotton, Lightweight, Low Elongation.
MIL-D-10860 (QMC) T, M, **
Duck, Cotton, Fire-, Water-, Weather-, and Mildew-Resistant.
MIL-B-15008 (Ships) F
Boards, Plottings and Status, Edge-lighted.
MIL-M-15023 (Ships) T
Meter; Megohm, Insulation-Resistance-Indicating.
MIL-R-15048 (Ships) F
Reproducer, Sound (Disc Dual Speed Portable).
MIL-C-15050 (BuOrd) T, M, *
Canvas, Treated; Waterproofed, Fire- and Weather-Resistant.
MIL-B-15081 (Ships) T, **
Bags; Clothes-Bedding, Crew's.
MIL-S-15103 (Ships) F
Salinity Indicating Equipment.
MIL-P-15127A (Ships) F
Projector, Lantern Slide (3¼ × 4 in.) Type IC/QPJ.
MIL-P-15158 (Ships) F
Projector, Slide and Strip Film-Type IC/QPI.
MIL-C-15159 (Ships) M, **
Compound, Preservative; Fire-, Water-, Mildew-, and Weather-Resistant (For Canvas).
MIL-S-15291 (Ships) F
Switches, Rotary, Snap Action, Bureau Design.
MIL-A-15303 (Ships) F
Audible Signals, Interior Communication and Small Craft (Bells, Buzzers, Horns and Sirens).
MIL-S-15306B (Ships) F
Stations, Call-Signal, (Type IC/D) (Hand Crank Magneto and Call-Signal).
MIL-M-15338 (Ships) F
Mechanical Order and Indicating Equipment.
MIL-B-15377 (Ships) F
Bearing Monitor Equipment.
MIL-S-15418 (Ships) F
Summary Plotting Boards (Synchro) (24 Inch).
MIL-H-15425A F
High Temperature Alarm Equipment.
MIL-M-15472 (Ships) F
Motor Driven Relay.
MIL-P-15555 (Ships) F
Propeller Revolution Indicating Equipment, Magneto-Voltmeter (Naval Shipboard Use).
MIL-F-15689 (Ships) T
Floats, Life, Reinforced Resin Laminate with Low Density Cellular Cellulose Acetate Core.
MIL-C-16032 (Ships) F
Switches, Pressure & Thermostatic (Naval Shipboard Use).
MIL-T-16070 (Ships) T, M, **
Treatment, Mildew-Resistant, for Rope.

NAVY DEPARTMENT SPECIFICATIONS

17 G 9 F, T
Generator-Sets, Diesel-Engine-Driven, Direct- and Alternating-Current, Stationary (Shore Use).
17 I 34 T, *
Insulation, Electrical, Synthetic-Fiber, Untreated (Group SFU).
17 I 46, Amend. 1. T, *
Insulation, Electrical, Synthetic-Fiber, Treated (Group SFT).
17 S 16a T
Switching-Equipment, Bus-Transfer, Magnetically & Manually Operated.
17 T 19e, Amend. 3. T
Transformers, Electric, Miscellaneous (Exclusive of Power or Distribution and Instrument Types).
21 R 7
Superseded by MIL-T-2448
52 C 26
Superseded by MIL C-15159
52 C 35 (INT)
Superseded by JAN-C-173
52 T 15 (INT)
Superseded by JAN-T-152
52 V 13
Superseded by MIL-V-1137

Bureau of Aeronautics Specifications

16 E 5 (Aer) T
Aircraft Electronics Equipments: General Specification.
17 F 19 (Aer), Amend. 1. T, *
Frequency Changers, General Specification (For Aircraft Use).
17 I 60 (Aer)
Superseded by MIL-I-6048 (Aer).

Bureau of Ordnance Specifications

52 L 20 (Ord) M, *
Lacquer, Moisture- and Fungus-Resistant.

52 L 21 (Ord) M, *
Lacquer, Cable, Fungus-Resistant.

52 T 15 (Ord) T, *
Treatment, Moisture- and Fungus-Proofing, of Elements, Components, and Assemblies, Electrical and Electronic: General Specifications.

52 V 23 (Ord) M, *
Varnish, Moisture- and Fungus-Resistant (Air-Drying).

52 V 24 (Ord) M, *
Varnish, Melamine, Moisture- and Fungus-Resistant (Baking).

52 W 7 (Ord) M, *
Wax Solution, Fungus-Resistant.

Bureau of Ships Specifications

16 E 4 (Ships) F, T
Electronic Equipment, Naval Ship and Shore: General Specification.

* Mildew-Resistance of Organic Materials (Textiles, Leather, etc.); General Specification of Methods for Determination of (Appendix IX to General Specifications for Inspection).

DEPARTMENT OF THE ARMY SPECIFICATIONS

3-138A T
Compound; Waterproofing (For Fabrics).

3-186 M, *
Sealer, Wood, Preservative.

3-189A M, *
Stain, Preservative, Water Soluble.

3-190A M, *
Stain, Preservative, Asphaltic Type.

3-202 M
Stain, Wood, Olive Drab.

3-210 M, *
Varnish, Moisture & Fungus Resistant.

4-1131A T, M, **
Compound, Textile Preservative, for Field Treatment.

6-53D T, **
Webbing, Elastic.

6-170C T, **
Kit, Tool, Canvas, M-1921 (Empty).

6-186A, Amend. 1. T, M, **
Webbing Cotton, Olive Drab, for Bandoleers.

6-187A, Amend. 2. T, M, **
Cloth, Cotton, Olive Drab, for Bandoleers.

6-200B, Amend. 2. R
Covers (Tarpaulins) and Curtains: Cotton Duck (For Motor Vehicles).

6-345, Amend 2.
Superseded by MIL-D-10860 (QMC)

6-360 T
Cloth, Sheeting, Cotton Napped.

6-377 T, M, *
Pack, Field, Cargo-and-Combat, M-1945.

6-398A
Superseded by MIL-S-2277

6-401, Amend. 1. T
Trousers, Firemen's, Bunking.

6-467
Superseded by MIL-C-2221

6-472 T
Bag, Personal Effects, O.D.

6-476 T, **
Tent, Shelter Half, New Type.

7-23 R, **
Screening, Insect, Nylon.

7-25 T, **
Cloth, Nylon Duck, Lightweight (For Use in Body Armor).

9-100 T, M
Straps, Pads, Reinforcements: Leather for Automotive-Vehicle Equipment.

15-3-B, Amend. 1. T, M, **
Twines RP-13, RP-14, RP-15.

39-13
Superseded by JAN-C-765

47-61A T, M, *
Floats, pneumatic, with emergency kit, 13-ton M-3 and 18-ton M-1, with carrying case.

49-42, Amend. 1. T
Charge, Springing, Rod, Earth, Blast-Driven.

51-0-4 T, **
Painting & Finishing of Artillery Material Other than Fire Control; General Specification For.

52-17-20 T
Insulation, Heavy Saturated Sleeving.

52-17-21 T
Insulation, Varnished Tubing.

60-977-2 R, *
Electrical Components, Waterproof, for Automotive Vehicles: General Requirements for.

71-1370-B T
Maintenance Equipment ME-13-( ) (Component for).

91-120 T, M
Cable: Inter-Vehicle, Single- and Multi-Conductor.

92-61, Amend. 1.
Superseded by Federal Spec. O-L-164.

100-17 T, M, *
Mildew-Proofing of Fabrics, and Cordage, Copper Process.

100-46
Superseded by MIL-M-2312.

Army Ordnance Department Tentative Specifications

AXS-992 T, *
Leather: Artificial (Upholstery).

AXS-1134
Superseded by Army Spec. 6-345.

AXS-1244 T, M, *
Mildew Proofing of Cordage and Thread; Copper Naphthenate Process.

AXS-1247 T, M, *
Mildew Proofing of Cotton Duck, Webbing, Belting and Thread.

AXS-1296 T, M, *
Mildew Proofing of Webbing and Thread, Zinc Naphthenate Process.

AXS-1311
Superseded by Army Spec. 3-210.

AXS-1416
Superseded by Army Spec. 92-61.

AXS-1672 T, **
Leather, Moisture and Mold Resistant Treatment.

Chemical Warfare Service Tentative Specification

197-54-394A T, *
Mildewproofing; General Specification.

Corps of Engineers Tentative Specifications

T-1212C
Superseded by Army Spec. 39-13.

T-1279D T, M, **
Paint, Camouflage, Oleoresinous, Emulsifiable.

T-1452
Superseded by Army Spec. 100-17.

T-1732A
Superseded by Army Spec. 47-61.

T-2278 T, M, *
Mildew-Proofing of Cork Products.

Frankford Arsenal Tentative Specifications

FXS-934, Amend. 1. M
Enamel: Lacquer, Nitrocellulose, Gloss, (For Electrical Terminations).

FXS-971 T
Varnish Treatment, Moisture and Fungus-Resistant for Ordnance Electrical Equipment (Overall Treatment of Assembled Equipment).

FXS-972 T
Wax Treatment, Moisture and Fungus-Resistant, for Ordnance Electrical Equipment (Overall Treatment of Assembled Equipment).

FXS-975 T
Varnish Treatment, Moisture and Fungus-Resistant for Organic Components.

FXS-976 T
Wax Treatment, Moisture and Fungus-Resistant, for Flexible Wire Harness.

FXS-995 T
System, Remote Control, M12, Amplifier, M1A1 and Drive Motor, M2A1, Modification of.

Quartermaster Corps Tentative Specifications

JQD # 63B
Superseded by MIL-F-2066

JQD # 64B
Superseded by JAN-T-1110

PQD # 198
Superseded by Army Spec. 6-472.

PQD # 256E
Superseded by MIL-H-1965

PQD # 425A
Superseded by MIL-B-1960

PQD # 447
Superseded by Federal Spec. CCC-T-191a.

JQD # 548
Superseded by MIL-B-1290

JQD # 643A
Superseded by MIL-B-1591

JQD # 694
Superseded by MIL-T-1712

JQD # 695
Supereded by JAN-T-1111

Signal Corp Tentative Specifications

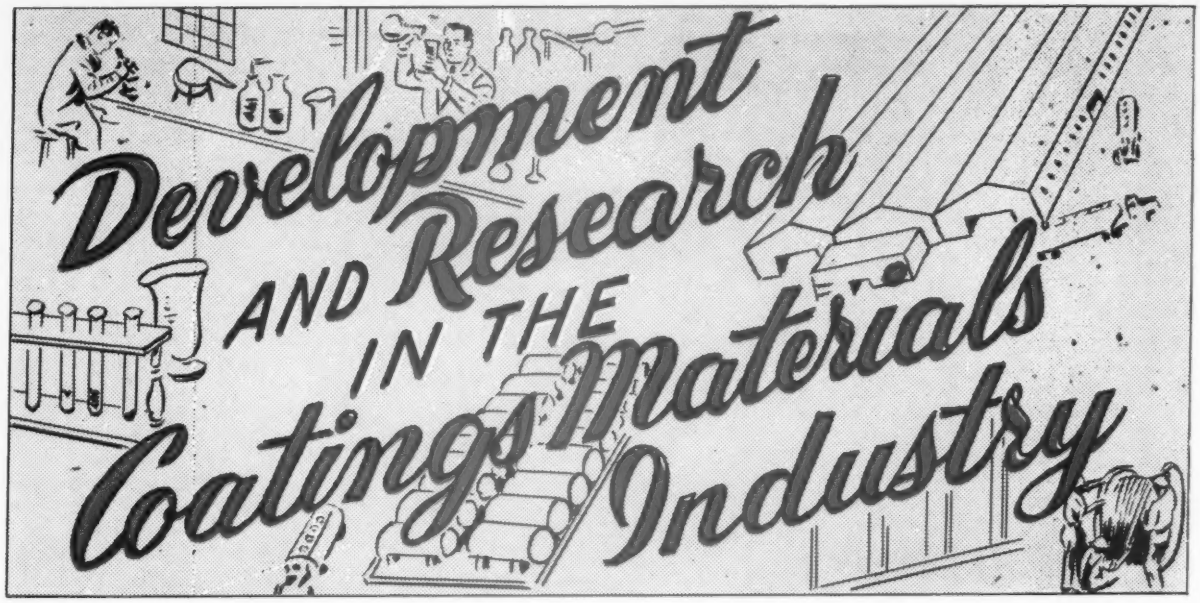
71-2202A
Superseded by JAN-T-152

71-3179 T, M
Power Equipment Treatment (Tropicalization).

72-84
Superseded by JAN-C-173.

72-95, Amend. 1. R, *
Coating Materials, Hot-Melt, Moisture- and Fungus-Resistant).

(Turn to page 56)



PART II

FACTUAL INFORMATION—THE STARTING POINT OF RESEARCH AND DEVELOPMENT

By
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"LOOK before you leap"—analyze your information before tackling any project, whether you are developing a coating raw material, designing a paint formula, presenting your product to a customer, or making a report for your stockholders.

Analytical review of information does three things: it enables you to frame your program to be suitable for use under many other similar situations; it enables you to see the problem; it tools you up to make the most of your opportunities.

It does these things because by assembling your information you get familiar with it and take advantage of every facility at your disposal. Sustained informational analysis keeps you astride of changing circumstances that effect your problem.

Before we can cooperate toward Profit-Making, we have to handle many kinds of information—about materials, conditions, results, markets, specifications, demands, uses, and effects.

We have to get information—store information—pass it along to others.

How real is our information? Do we handle our information effectively now? What information problems confront Development and Research Work? How can we improve our information handling for the future?

Your informational backing is a fusion of three technics: collecting facts and data, evaluating facts and data, tabulating facilities and assets.

Information is the springboard of intelligent action, and it is the steady ingredient of a continued good performance. With information as your balance—you weigh the resources at your command, the field you wish to cover, the intensity with which you can cover it and the results you desire to get.

Facts About Facts

BECAUSE our Research and Development structures are rooted in and grown from facts and information, let us first get some of the facts about "facts." The prime rule, most often said to apply to "sound business" but more definitely applying to Research and Development, states "first collect your facts." This sounds easy, but to "collect your facts" is one of the most perplexing phases of any Research or Development Project of serious proportions. The "fact" you are trying to capture has some very special characteristics as to what it is and what it does. Here are some of the ways in which your "fact" may act:

1. It varies as conditions around it vary.
2. It occurs under conditions so complex that not all the conditions can be reported.
3. It is dependent on many other facts.

Editor's Note. Including suggestions on methods of working and methods of organization for both laboratory chemist and executive, Mr. Woodruff writes these discussions based on his own varied experiences. The facts and examples he uses do not necessarily represent the practices of any single company.

In the next article of this series, Mr. Woodruff will discuss—Detailed Research Technics—Exploring and Map Making.

4. It appears different to different observers.

5. It is as nearly as possible concrete.

This means that the "facts" you collect are a "reported group of approximations partially describing an actual condition."

In the past, the practical approach was to ignore the conditions, state the "fact" as absolute and act accordingly. The Research approach is to state the fact and at the same time state the conditions at the time of observing the fact as completely as possible, by means of abbreviations or similar conventions. The modern approach is the "evaluation approach" and facts are stated with a description of the conditions (either abbreviated or implied) and often with the label "confidence limits." In this way there is a continued and often growing awareness that "facts" are conditioned approximations.

Let us squarely face the fact that the certainty of our factual knowledge is relative, but let us use a technic available to us which will alert us to any gross irregularities or errors in observation and enable us to reobserve and correct our items of data. This technic consists of first systematic sorting of facts and then classification of the items of data. This is the method of building "information."

How we build Information—Classifications—The second prime rule in "good business" and in good Research and Development is "handle your facts systematically." Systematic handling is essential in order to:

1. Prevent leaving large gaps or loopholes in your data.
2. Look at all facts before a project or program is begun.

The systematic handling of facts is the basis for the evaluation of a situation.

Evaluation of a situation is really a classification-analysis technic using facts as tools. In a situation-evaluation we want all the facts; then we evaluate all before any program is begun. We look at facts favoring a program to use them; we look at adverse facts to consider their efforts and means necessary to compensate for them. To look only at the good facts at the beginning of a program often results in abandoning a program during the work when the adverse facts become apparent.

"Classification" for our purposes, then, becomes an "array of facts in connection with a given subject so arranged that any missing data will be apparent and any irregularities in the data can be reexamined." When data is classified in relation to more than a single objective it then takes on another characteristic—it becomes "information."

Uses of Information—We use information most frequently to define.

The "definition" process is both the formation of information and the transmission of information. In operational use a definition is the use of a certain road to take your bearer from a common referrent to one which is new to him. Reduced to simplest terms, it depends on the establishment of a common ground, the establishment of a destination, and the establishment of a connecting road.

To define—to describe—convey information for a purpose.

Routes of definition are paths of relationships within structures of data—these are:

1. Exposition of similarities and dissimilarities to previously available data.
2. Exposition as part of a larger body of data.
3. Exposition of the individual parts of the data concerned.
4. Exposition by measurement of position or point of origin.
5. Exposition by shape, size, state.
6. Exposition by composition, shape, effect on the senses, weight, color, temperature.
7. Exposition of use.
8. Exposition of how to cause —, effects caused by—.

A definition is of necessity a pinpoint within a pattern since a definition must:

1. Describe the general classification in which the defined item falls.
2. Describe the specific classification in which the defined item falls.
3. Differentiate between the defined item and all similar items.

To define is definitely to open the channels to information and to action.

Information And Its Special Characteristics

JUST as facts are very special in character and action, so information has its special properties. Some of these are:

1. Information is necessarily connected with an objective. This requires the process of (a) defining the objective; (b) selecting the facts relating thereto and separating from all other facts; (c) positioning said facts into a classification. Data not connected with the objective remains unused raw material in our data-warehouse.
2. Information indicates connections between facts as well as the facts themselves. Facts selected in relation to an objective when classified become a pattern or structure. The pattern points out a correlation between the facts. Correlations can be expressed graphically, numerically, statistically, algebraicly, mechanically. Correlation indicates the direction of a fact, its potential energy, its pro and contra. But direction, position, potential are abstract conceptions, not directly observable, and non-concrete. This points-up the third peculiarity of information.
3. Information is abstract; but based on and distinct from the concreteness of fact.

Beware of Extrapolation—Directions, potential, positioning *between* known facts constitutes information. Lines, trends, connections between facts have also been called intrapolations. Intrapolation is an extreme abstraction of factual data. But the extension of line, trend or graph beyond established data represents extrapolation—of this beware. Extrapolation is worse than a clearly labelled guess—the guess can be identified as such—but extrapolation is often mistakenly identified as information.

Information—The Springboard For Action—The Research and Development processes are processes of action. The language of action involves numbers. Meaningful research is quantitative. Satisfactory research and satisfactory development is the building of quantitative explanations.

The jumping-off place, the starting point is the specific point out of:

(a) gaps in a system of knowledge (Research will fill them in)

(b) gaps in a system of needs (Development will fill them in)

The pointing-out being quantitative terms—in the language incitive of scientific action—in the language of numbers.

Information for Evaluation of Resources—Again facts arranged into pattern and expressing a quantitative ratio which tell us more than the facts themselves,—the ratio of what we have and know against the possibilities for having and knowing.

In terms of field of operation, evaluational evaluation tells us how we stand within a given field and indicates what fields warrant continued attention.

Information for Trend Evaluation—It is common to evaluate Industrial and Business trends graphically. The result of trend-knowledge is balance for an individual or a company. Knowing general trends, he does not react to an isolated fact or occurence as if the single occurence represented the entire trend.

Trend Analysis by graphic or numerical representation is becoming an important tool in all phases of experimental research and development as we shall discuss in detail at the appropriate places in this series.

Handling Information

EACH investigator needs a file indexing the data that he has available and on which he has tested reliance. This means that as he goes along he collects data and makes reports—even if reports are not required by his business connection —his reports show: items of data, limitation of the data, information gained, where the information fits into his previously available information.

Each investigator also has contact with information other than what he evolves himself. On receiving this new information he proceeds to classify it in terms of what he already knows. In receiving the new information four things happen to his structure of information—

1. The circumference of the structure is pushed outward.
2. The interior structure of related information is altered in that guesses are converted to facts.
3. A new gap in knowledge is created.
4. The gap becomes a challenge for him to fill in.

This means that each new item of data must be fit carefully into place and that each man can have a gauge of his technical progress, fact by fact, and there is a clear cut indication of the next step forward.

Details are necessarily kept in reports and indexed in a file, but the plan and gauge of progress is most effectively kept on a Technical Knowledge Chart.

Tabular Analysis and Presentation—In any case the new dictum applies —systematized material is best presented in tabular form. The systematized material will fall into one of the following patterns:

Patterns for Tabular Analysis and Presentation—Definition Pattern—(The position chart); Need to Supply Pattern—(gap chart of requirements); Cause-Effect Pattern—(an item-item correlation pattern); Use to Supply Pattern—(gap chart of possibilities); Pro and Contra—(The Balance sheet for action chart); Time Table—(The action chart); The Record Chart — (Historical Time Table).

The above patterns are listed in the approximate order they appear as a program is going forward, through research, product development, and sales development stages. We have just discussed "Definition Patterns." Need-to-supply patterns usually appear in the province of Market Research; cause-effect pattern in Research; use-supply patterns in Development; Pro-and-con-patterns in Management as are Time Tables and Record Charts. Each will be discussed in more detail as occasion arises in this series.

Pattern presentation is an abstract index to verified available information. The pattern itself gives indication of the comprehensiveness of the data delineated.

Where more comprehensive treatment is required, this will be readily apparent from the pattern.

Problems of Patents

PATENTS are unique in the literature of chemistry and coatings materials technology because they are the first (and often the only) available source of information regarding numerous industrial materials and processes. In many respects patents can be regarded as a peculiar kind of textbook and the source of the latest technical information reported throughout the world.

The language of patents differs widely from that of any other chemical literature and the assertions in patents must not be accepted without verification. Patent language is a transformed chemical language, the transformation being caused by the fact that patents are worded in the language of equivalence. Starting with the principle that no isolated "fact" occurs in nature, once a new single fact is discovered the patent viewpoint assumes there must be a number of analagous facts and that the next step will be to look for them. Then an inventor searches a "reasonable range of examples" and is entitled to a claim of such a scope as to cover an entire classification of data.

As a result of this legal situation inventors try to get as broad a patent coverage as possible. Here is where the trouble starts. The inventor, instead of looking for facts, looks for conclusions, and accordingly selects for his basic claims a very broad class which includes the class he actually has tested. But he assumes all members in the class will be equivalent to those he has tested—in other words he extrapolates. Accordingly a high percentage of patents which become the subject of litigation are shown to be invalid because investigation shows the claims are broader than his inventive concept. Since this condition prevails in a majority of patents, the phrasing, scope and intent of a patent serve to confuse a reader not specifically familiar with patents wording.

On the other hand a considerable perspective can be gained on the state of any facet of the industry by the style of patents issued. A patent issued while a phase of the industry is in the formative state will contain many new observations and few theoretical concepts. A patent from the same industrial facet somewhat

later will appear very similar to a textbook and contain detailed theoretical background and comprehensive exposition of a limited amount of new material.

It is important to develop and maintain contact with the rapidly changing patent scene by reviewing the patents as they appear, within the pertinent field of information concerned and to evaluate each in terms of the history of the field and in terms of future potential. The facts asserted in the patent must be verified before final acceptance.

Individual vs. Group Information

THE process of converting facts, details, items of data into information can be done by one man, or by a group of men.

One man, working without conscious effort—often so habitually that he does not know that he does it or the mechanisim by which he does it, takes a cluster of facts, organizes them into a pattern suitable for his use and in so doing changes the facts into his information.

But our Coatings Materials Industry is far beyond the one man stage. We work with many companies, hundreds of men, and large masses of facts data and records. This means that we must provide for a group of men to do consciously what one man usually does unconsciously.

From the standpoint of size alone our industrial situation creates a problem of handling details in large masses. The individual items of data must be recorded, related, made available for use. The process on a large scale must be consciously planned for, carried out and controlled.

Struggle to Organize

OUR problems connected with data, information, records, and results today are mainly the problems of mass handling and mass communication.

We do have methods—in process of development, though they may be —for sorting and correlating data—for purifying and pinpointing facts, and for making scientific abstractions, but as an industry we are struggling with the birth of methods for mass handling of data and for the mass transmission of information.

There is a great deal of effort going into the mass problem and it definitely appears that a rudimentary form of technic is being developed. Many people think the next few years will reveal outstanding results of across-the-board organization and transmission of data and cooperation of individuals and companies toward organized mass information.

Handling Information in Mass

INFORMATION in mass must be information that means the same thing to each recipient—if we cannot separate facts from conditions connected with them we must see to it that the conditions are (as far as possible) the same each time.

Various societies, such as the American Society for Testing Materials and the American Standards Association are indications of the current reach for standardization. Standards Methods are finding wider acceptance as the methods are improved and as organizations realize that without standardized methods information becomes confused to the point where its utility stops.

Nomenclature and classifications are becoming standardized—witness the formation of the Fatty Acid Producers Group setting out with the clearly stated purposes of:

1. Standardizing the nomenclature in the Fatty Acid Industry.
2. Agreement on specifications and methods of test for standard fatty acids.
3. Publication of statistical data on the production of fatty acids.

This type of voluntary standardization can be expected to appear in many more segments of industry connected with the Manufacture of Coatings Materials. It favors producer, user, and compiler of information.

Handling of Data—Forecast

MECHANICAL handling of data for purposes of inventory, personnel, purchasing and bookkeeping records became common during World War II. From these fields the ideas spread. The seeds planted within the last two years in the Chemical Product Industries are just beginning to sprout. These are:

(a) photographic recording and electronic sorting of information,

(b) punch card recording and supplying data.

In this year (1951) the first book covering the technics of classifying data for quick reference has appeared. This book entitled "Punched Cards—their applications to science and industry". This is edited by Casey Perry but the data is contributed by a staff of collaborators. There is reason to believe that mechanical handling of data will far extend our ability to handle and transmit mass information beyond the present limitations of library indexing and printing.

The punched card systems—either hand sorted or machine sorted appear as suitable depositories for recording information, for indexing, and for rapid sorting individual items as required. In addition the punched card systems have been applied to correlation of data, determining cause–effect relations and for computation.

Statistical Data

CLASSIFYING and sorting data in terms of a new language and using new tools.

The fact that the application of statistical methods to various phases of the Coatings Materials Industry is the subject of much discussion both *pro* and *contra* makes it clear to all that statistical methods will aid us in solving many problems now confronting the industry. In the study of processes now operating on a large scale and not reproducible when run on a small scale seems to be a place where statistics will start to help us. In the design of experiments, in probing for correlations.

At present the application of statistical methods must be done by statisticians. When it can be used by at-the-bench research and development men, its full utility will become apparent. This will take more time and more indoctrination.

Looking Ahead

WHAT will be our next steps in handling information in the Coatings Materials Field? Who knows. We can all guess. Some guesses are:

We will increase our use of centralized indexed information.

We will develop industry-wide standardization of raw materials, finished products, test methods and reporting methods.

(Turn to page 54)

Technical Committee Reports Featured at N. Y. Club Meeting

Two hundred and twenty members and guests of the New York Paint and Varnish Production Club turned out on October 11th to hear the fifth annual report of the activities of the Technical Committee Meeting.

Distinguished guests present at the meeting were Mitchell M. Shipman, the new executive secretary of the New York Paint, Varnish and Lacquer Association and Robert D. Bonney making his official visit to the New York Club as president of the Federation.

E. G. Shur, chairman of Subcommittee 61 on the Flooding and Floating of Multi-Pigment Paint Systems, presented a preview of his Convention paper.

Flooding describes a differential separation of pigments in a pigment mixture durng the drying of a paint film. Floating is a related phenomenon of *selective* differential pigment separation resulting in a non-uniform surface.

The scope of this work was restricted to a study of the effectiveness of silicone oils in reducing flooding and floating. A drop test for the effectiveness of anti-floating agents was developed.

No silicones tested had any observable effect on flooding. Methyl silicones were found to be most effective in reducing the floating of many paint systems. The silicones apparently act by concentrating at the air interface of the film and reducing the surface tension. They may therefore be considered as surface agents which are active in *organic* media.

No evidence was found that the silicones are active at pigment-vehicle interfaces.

Stanley H. Richardson, chairman of Sub-Committee 37 reported on the Investigation of Methods for Measuring Drying Time. Two Federation papers have already been presented by this committee in 1946 and in 1948 on two phases of their work. New testing equipment has recently been received by this subcommittee and work will be completed on "Tack Free Time." They are also working on "Print Free Time" test methods.

Sub-Committee 44 on Emulsion Paint with James A. Massaro as Chairman are currently working on a study of the pigmentation of emulsion systems. Due to the current high interest in the latex type paints, these emulsion vehicle systems were selected for study at this time.

Executive Committee of New York Paint and Varnish Production Club
Left to Right: F. M. Damitz, E. D. Albert, Dr. Ralph W. Charlton, W. Santoro, C. Aloia, H. Hillman, J. Lundgren

Raymond L. Whitney reported for Sub-committee 53 on a Study of Pigment Dispersion. This committee has already presented three convention papers in 1946, 1948 and 1950. The present program of the group is to investigate the effect of various thinners or solvents on the efficiency of pigment dispersion. Their work has indicated that advantages can be gained by proper selection of the solvent to be included in the mixing and grinding operation. The advantage is apparent not only in better fineness of grind, but also, the tinting strength, hiding power and gloss are improved.

Edward J. Dunn Jr., Chairman of Sub-Committee 40 on Methods of Measuring Dry Hiding Power of Paints, presented a preview of the second New York Club Convention paper.

The Committee has developed an improved method for determining the dry hiding power of paints. In essence, the method comprises mechanically spreading uniform films on hiding power test charts, allowing them to dry and determining the reflection of the films over the alternate black and white areas. From a plot of this data plus the specific gravity and volatile content of the paint, the film thickness required to give a specified contrast ratio may be calculated Similarly, the film thickness required for complete hiding, taken as 98% contrast ratio, may be readily determined from the graphical presentation of the data. Film thickness is converted to spreading rate in square feet per gallon by means of a graph appended to the method.

Dr. Marcus Thau, Chairman of Subcommittee 54 on Dielectric Strength of Pigmented Varnish Films, reported that his group is accumulatng test data on the electrical constants of pigments. The work involves the use of a paraphenyl phenol tung oil varnish of 25 gallons length in to which the various pigments are ground. The paint films are dried and baked under various standardized conditions and finally checked for hardness, abrasion resistance, flexibility, water resistance and dielectric strength. The purpose is to improve finishes that are subjected to high voltages in electrical apparatus.

Sub-committee 58, Standards and Methods of Test under the Chairmanship of Frederick M. Damitz is one of twenty-two such committees in the Federation. The work of these groups is to see that methods of test developed after long and hard work by other technical committees do not become lost in the shuffle. Methods are written up in a standard form and sent to constituent clubs and A.S.T.M. for comment. After careful consideration of all criticisms a valuable method is developed for general use in the industry and in many cases as a joint standard with the A.S.T.M. Fred covered briefly the specific operations and procedure followed by his committee. At present six methods of test and twelve specifications are being rewritten for presentation at the Federation convention.

•

Metals Disintegrating Co. Appoints AMSCO

American Mineral Spirits Co. are now distributors of MD Aluminum pastes and Gold Bronze powders manufactured by Metals Disintegrating Co., Inc., Elizabeth, N. J. in the New York area, New Jersey, Eastern Pennsylvania, Maryland, Delaware and the District of Columbia.

MD sales representative will also continue to maintain direct contact, with metal pigment users in the indicated areas to further supplement the direct coverage of American Mineral Spirits Co.

A real "plus" for the paint industry

(From Canco—a friend for 50 years!)

For the past half century, Canco has co-operated with the paint industry on problems of containers, merchandising, research, and production.

Now, in these vexing times, Canco is prepared to bring the paint industry a real "plus."

This "plus" is Canco's "Know-how" acquired during 50 years of experience in meeting unusual problems.

Today, such "Know-how" can often be profitably applied to baffling situations resulting from shortages and allocations.

You'll find Canco's knowledge and resourcefulness particularly helpful in these critical years.

1901—50TH ANNIVERSARY—1951

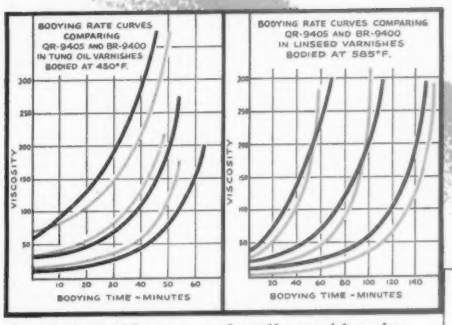
CANCO

AMERICAN CAN CO.

New York · Chicago · San Francisco · Hamilton, Canada

BAKELITE High Spots at the

TRADE MARK



A New 100 per cent phenolic varnish resin


BAKELITE

RESINS FOR GOVERNMENT SPECIFICATION COATINGS

A Reference Guide to Government Specification Coatings

Oil-modified styrene copolymers for high-gloss, fast-dry enamels

Polystyrene resin emulsions for color-retentive wall paints

1951 Paint Industries Show

THOROUGHLY TESTED AND EVALUATED PRODUCTS THAT WILL HELP YOU OPEN UP NEW MARKETS!

Here are just a few of many products and developments that coatings manufacturers saw and studied at the Bakelite Company Exhibit at the Paint Industries Show.

Outstanding features included a 100 per cent oil soluble phenolic varnish resin, BAKELITE QR-9405, developed to supplement the supply of long-established BR-9400.

They availed themselves of a handy reference bulletin detailing BAKELITE coating materials and recommended formulations to meet Government specifications. They saw a display of typical applications of these materials.

Another display covered plasticized polystyrene emulsion wall paints and sealers for trade sales, based on BAKELITE BKS-114, stressing color retention.

There was a special showing of C-10 styrenated polyester solutions based on BAKELITE BJS-155 for high-gloss enamels, hammer finishes, and paper coatings. A brand new product, RJS-159, was introduced. It is a roller mill grinding medium compatible with BJS-155, for brush or spray enamels. It serves also as a plasticizer for baked amine coatings.

In addition, visitors saw interesting exhibits of resin baking phenolics for maximum chemical resistance, and oil-extended C-9 resin BR-17920 for trim paints and house paints.

In more than forty years of introducing new resins, it has been the policy of Bakelite Company to offer thoroughly tested and evaluated products to help manufacturers open up new and profitable markets.

If you were unable to attend the show and would like additional information on these BAKELITE Coating Resins, simply write Dept. CZ-38.

BAKELITE
TRADE-MARK
COATING RESINS

TRADE MARK

BAKELITE COMPANY

A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

SOME 2500 members and guests were on hand at the 63rd annual convention of the National Paint, Varnish and Lacquer Association held in Atlantic City, October 29th–31st. Interest ran high as representatives of the paint industry heard leading spokesman from Business, Government and the Military tell of their respective programs and how it will affect our national economy during the present emergency. In addition, they were given up-to-the-minute information on government controls and military specifications as pertained to the paint industry.

General Joseph F. Battley

General Battley emphasized the importance of the paint industry in the present national emergency. He said that in view of the international situation and the "Armed Peace Program" of this nation, the paint industry should expect and prepare for a continuation and even expansion of existing government controls.

"In fact considering the future outlook for the world economic situation, it could well be that government controls may have to stay," he stated.

He further stated that the paint industry has established an enviable reputation, not only for its ability to operate under these government controls, but more especially for the example it has set for cooperation with and material assistance to the Federal agencies with which we are concerned.

General Battley also pointed out that the association staff is now working very closely with NPA containers division for the purpose of understanding fully the government objectives and at the same time presenting the industry's position clearly and logically. The same cooperation is also maintained with OPS, and the chemical division of the NPA, especially the protective coatings branch.

In reviewing the activities of the Scientific Section, he spoke of the important work carried on by this group on the problem of "paint peeling". It has been proven that paint does not peel when moisture is prevented from penetrating the wood or other porous materials to which the paint is applied.

Senator Wallace F. Bennett

Senator Bennett spoke on the subject of "Decision". "The responsibility of decision rests with individuals and many have been shirking this responsibility," Senator Bennett said. Many believe that their government is a substitute for their making decisions, and they gladly dump their burdens upon government.

"Americans can reject these substitutions only by strengthening personal spiritual attitudes, by acting with wisdom and by willingly accepting the consequences of breaking from rigid governmental practices."

Leo Cherne

Mr. Cherne said that it is important for us to understand in this year that approaches, 1952, that decisions will have to be made on two levels. To be sure, to a far greater extent that we are willing to buy ourselves as individuals carrying the sovereign right of citizenship in a free society; but unhappily also to an extent we do not like by the government of our choice.

"I am emphasizing the responsibility of government for decision for a reason which has a particular connection with the year 1952. I am afraid that our governments have not been characterized with any degree of consistency, with a willingness to make courageous decisions, and I am afraid too, that the absence of such decision in 1952 may mean another year will pass in which decision is made for us by another government, the government of the Soviet Union."

Industrial Product Finishes Session

"Military Specifications and Uses" was the subject of the lacquer panel held on the morning of October 30th.

The panel included Dr. C. F. Pickett of Aberdeen Proving Ground, Mr. George J. Merritt of Quartermaster Generals Office, Mr. Alfred Malloy of Bureau of Aeronautics, Dept. of the Navy, and Dr. E. E. Jukkola, Wright Patterson Air Force Base.

Dr. Pickett announced that the Army Ordnance has recently introduced four new nitrocellulose base specifications. These were discussed in detail and included the following specifications:

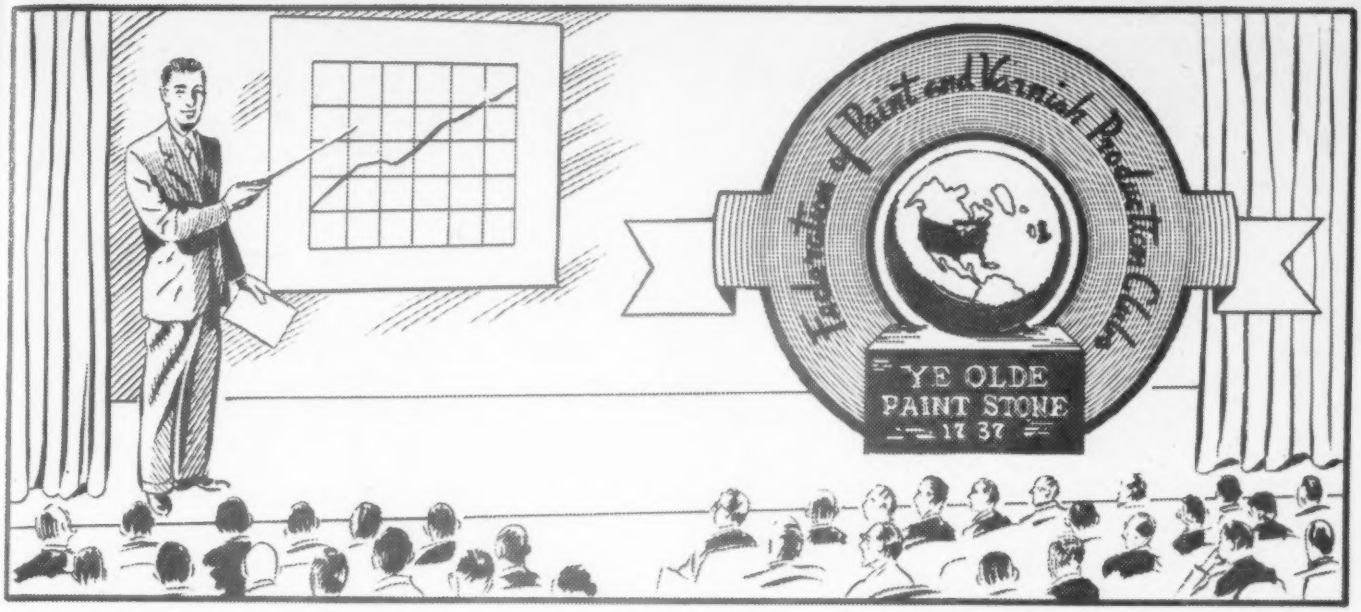
MIL-P-11414, a red oxide lacquer type primer containing a small amount of rust inhibiting pigment.
MIL-L-11195 is a hot spray lacquer. MIL-S-10181 is a lacquer surfacer for obtaining high coverage.
MIL-L-10182 gloss lacquer enamel for use on staff cars, busses and ambulances.

The need for lacquer base finishes is due to the fact that many army installations lack baking facilities; lacquers have fast drying qualities and result in speed up of production. By careful formulation and proper cleaning and treatment of metals, nitrocellulose primers can be used to great advantage. Previously, nitrocellulose primers were inadequate for specification use because of poor adhesion. He also pointed out that nitrocellulose lacquers are expected to be extended to maintenance purposes in the future.

Mr. George Merritt explained the use of hot lacquers in coating many items of the Quartermaster Corps. Coatings for the Quartermaster must be durable without abuse, and have good camouflaging qualities.

Mr. Alfred M. Malloy spoke on coating requirements of the Bureau of Aeronautics, Dept. of the Navy. He said that lacquer primer systems are inadequate; they do not meet the high adhesion requirement encountered in the present high speeds of jet airplanes. There is an urgent need for scuff resistant finishes; also a need for coatings which are not sensitive to humidity, cold, heat, etc. for protecting hangars and equipment. In summary, airplane finishes must have the following properties: light weight, good adhesion, scuff resistant, have a minimum

(Turn to page 54)



29th Annual Convention

INTEREST in the technical phases of the paint industry was clearly demonstrated at the 29th annual convention of the Federation and Paint Industries Show held recently in Atlantic City. With a record sales volume expected this year, it was apparent that the technical men of the paint industry were seeking new equipment, improved methods and new raw materials to turn out more and more better paint products.

As in previous years the Federation's research program received considerable interest and attention. Under the chairmanship of P. O. Blackmore and program coordinator, W. O. Lundberg, six interesting papers were presented. These covered such subjects as oxidation of films; chemical changes in films; stress-strain properties of clear and pigmented films; hardness, abrasion resistance, and accelerated weathering tests of various paint vehicles; studies of infared spectra of synthetic oils; and penetration of oxygen in drying oil films.

Two round table discussions were held on the last day of the meeting. Many of those attending these discussions acquired a wealth of profitable information which to put into practice in their plants.

The first discussions deal with "Strain- and Filtering Problems in Production"—and the second was concerned with "Specification Finishes".

Mattiello Lecture

This year's choice of the Joseph J. Mattiello Lecture was D. H. Wheeler, Research Laboratories of General Mills, Inc. His subject was, "Thermal Polymerization of Esters of Unsaturated Fatty Acids".

The complexity of the naturally occurring mixed glycerides of drying oils has recently led the oil chemists to a study of simpler esters of the unsaturated fatty acids, with monohydric alcohols, and to the study of these esters of pure unsaturated fatty acids instead of mixtures. By using pure methyl esters of individual fatty acids, it has been possible to develop methods of analysis which have given us a more complete picture of the chemical reactions which occur during their thermal polymerization and which will be of value in understanding the chemistry of the heat-bodying of oils.

Paint Industries Show

The 1951 Paint Industries Show was the largest ever assembled. Comprising seventy-eight exhibitors in all, this exhibition afforded a splendid opportunity for the technical men of the industry to see what was new in the way raw materials and equipment, to collect manufacturers' literature, and to discuss their problems with the many technical representatives who were on hand. Chairman for this years Paint Industries Show Committee was H. G. Sholl.

A highlight of this exhibition was the Hot Spray Solarium. This spectacular display was a cooperative effort by raw material and equipment suppliers featuring hot spray application of decorative and protective coatings. The exhibit showed a wide variety of hot spray application and emphasized the tremendous potential market for hot spray finishes.

In view of the present interest in specification finishes, many suppliers emphasized this particular feature in displaying their products and equipment.

Among the new raw materials exhibited were a 100% phenolic resin developed to augment the supply and new uses of this type of resin; a new pentaerythritol base resin for making semi-alkyd vehicles by varnish cooking procedures; silicone-alkyd combinations; and new castor oil free alkyd.

In the way of equipment, a new drum coating process was featured and a new Weather-Ometer utilizing many new principles among which is a modulated control of specimen temperature.

Club Papers

Method of Measuring Dry Hiding Power of Paint—New York Club

An improved method has been developed for determining the dry hiding power of paints. In essence, the method comprises mechanically spreading uniform films on hiding power test charts, allowing them to dry and determining the reflection of the films over the alternate black and white areas. From a plot of this data plus the specific gravity and volatile content of the paint, the film thickness required to give a specified contrast ratio may be calculated.

A Study of the Stability of Orange Pigments—Philadelphia Club

The Philadelphia Paint and Varnish Production Club, continuing its examination of the exterior stability characteristics of the pigments used in the manufacture of paints, presents the results of a study of orange pigments. Readings were taken at three, six, nine, and 12 months of panels exposed in masstone, a 50% tint and a 10% tint with a white pigment in both Delaware and Florida.

A Preliminary Study of Fine Pigment Dispersion on the Morehouse Mill—C. D. I. C. Club

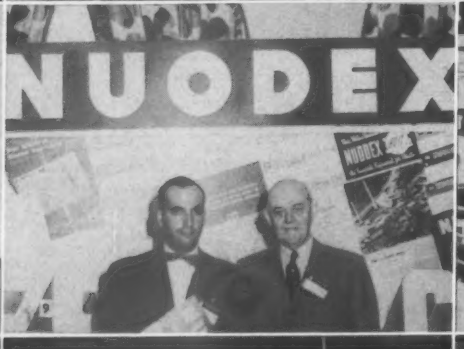
This paper deals with the methods employed in formulation of enamels to grind on the Morehouse Mill. Grinds of 7-8½ on the Production Club Gauge are possible with production rates up to 400 gallons per hour of finished product. All formulations and tests have been verified by 100 gallon production runs.

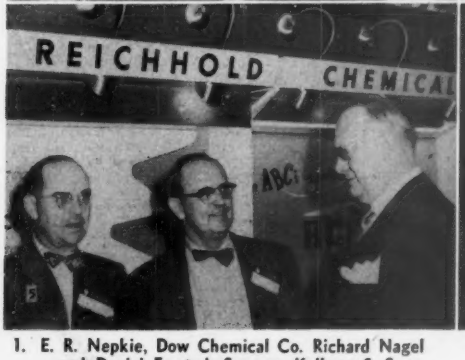
Evaluation of Paint Staining Methods and Equipment—Chicago Club

Evaluation of straining equipment becomes difficult and, perhaps, meaningless, unless standards of comparison are available. To provide such standards a method is described which gives a numerical rating to various degrees of cleanliness. Requirements for an "ideal" strainer are listed as a stimulant to equipment manufacturers serving the paint industry in the hope that someone will design a strainer incorporating these features.

(Turn to page 57)

Candid Shots Gathered at Paint Conventions—Atlantic City, N. J.





1. E. R. Nepkie, Dow Chemical Co. Richard Nagel and Daniel Farstad, Spencer Kellogg & Sons.
2. John A. Murphy, C. A. Klebsattel, Naftone Inc.
3. R. E. Johnson, D. D. Rubek, Anderson-Prichard Oil Corp.
4. Verne Bidlack, Penna. Color & Chem. Co., J. J. Clarke, Color Marketing, A. C. Mueller, A. C. Mueller Co.
5. P. L. Swisher, M. K. Pinkerman, Reichhold Co., Carl G. Sedan, Detroit, Mich.
6. J. H. Calo and A. R. Calo, John H. Calo Co.
7. James E. Heckel, R. T. Vanderbilt Co., Jack W. Hayes, Baker Castor Oil Co.
8. A. F. King, Jr. The Muralo Co., Milton K. Pine, Wesco Waterpaints, Inc.
9. Edward Salas, W. B. Bate, Nuodex Products, Inc.
10. Talbot Uehlinger, Miss Berry Uehlinger, Egan, Hausman Co. Inc., John F. Keller, Archer-Daniels-Midland Co., H. B. Almond, McCloskey Varnish Co.
11. C. V. Wittinwyler, H. W. Howard, Shell Chemical Corp.
12. Francis Scofield, National Ass'n, John H. Turner, British Resin Products, Arthur E. G. Brown, Dureko Products, Ltd., A. E. Horn (back to camera) A. C. Horn Co.
13. Dan Maguire, Jim Taylor, Tom Shields, U Press It Products Corp.
14. T. J. Starkie, James Cunningham, Mr. & Mrs. W. F. Twombly, R. I. Wishnik, Witco Chemical Co.
15. H. E. Weisberg, N. D. Scow, W. J. Hartmeyer, Mineral Pigments Corp.

Candid Shots Gathered at Paint Conventions—Atlantic City, N. J.

16. N. J. Timmons, Gerould Allyn, Rohm & Haas Co.
17. The Ross family
18. W. K. Hilty, W. F. Schlesinger, D. H. Elliot, J. G. Macauley, Ross & Rowe Inc.
19. W. H. Patrick, L. M. Datt, American Cyanamid Co., W. E. Manring, Goodrich Chemical Co., W. L. Hensley, American Cyanamid Co.
20. R. Lynch, D. Farnsworth, H. Shakespeare, T. Curry, H. Norris, R. B. H. Dispersions
21. Harry B. Paul, R. W. Hunter, M. D. Brewster, L. G. Parkinson, Atlas Powder Co.
22. Al Counter, Barker Chem. Co., Norman D. Cota, Jr., Patek Bros. Inc. E. W. Kaufmann, A. D. M. Co., W. D. Schwartz, Patek Bros., W. G. Andrews A. D. M. Co.
23. E. W. Dill, R. R. Huddleston, Patterson Machine & Foundry Co.
24. Wells Newell, U. S. I., George Hano, Crownwell Chem. Co., Arthur Shelling, M. Lubman, Fred Byerly, U. S. I.
25. J. A. Loretsch, F. G. Weigand, F. J. Burnett, G-E., F. B. Rethwisch, G. M. Babcock, Reynolds Aluminum Co.
26. Chris Vander Valk, Lead Industries, Guy R. Pratt, Continental Products, Karel Vetterwinkel, National Lead Co., John R. Mac Gregor, J. R. Mac Gregor Lead Co.
27. C. M. Ambler, James E. Paul, Sharples Corp.
28. Sidney Lewis, Howard Aareas, U. S. Stoneware, Bill Kirschner, Ralph Gross Advertising Agency, F. D. Reali, U. S. Aviation Supply Office
29. C. W. Zink, E. Jeanne, Epworth Mfg. Co.
30. R. H. Juve, R. J. O'Hara, Al Lilla, Dan Hereley, D. L. Cable Ferro Chemical Co.

ARTHUR MINICH

Nuodex Promotes Minich

Arthur Minich, formerly vice president in charge of research and development, has been appointed executive vice president of Nuodex Products Co., Inc., Elizabeth, N. J.

Under Mr. Minich's direction, Nuodex developed Napalm, the gelling agent for gasoline used in incendiary bombs and flame throwers.

Nuodex and Mr. Minich also hold three patents which made it possible to ease the critical supply position of naphthenic acid during World War II and during the present defense effort. As a result of his war contribution Mr. Minich has received a citation from the War and Navy Departments and a certificate of merit from the Protective Coatings Branch of the War Production Board.

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Battelle International Established in Europe

Battelle International, the international research institute, will maintain laboratories and offices in several Western European countries. It will, in addition, place research investigations in existing research institutes of Europe and in European universities and technical schools.

Battelle International proposes to serve the European economy, on a nonprofit basis, through science and technology. It will conduct research in the field of applied chemistry and physics, metallurgy, fuels, ceramics, electronics, theoretical and applied mechanics, the engineering sciences and agriculture.

"Tiny" Anderson Joins ADM

Larry (Tiny) Anderson, well known in paint circles, has joined the sales staff of the Progressive Varnish Works, a Div. of Archer-Daniels-Midland.

Upon graduation in 1935, he joined the Western Paint and Varnish Co. of Duluth and advanced to chief chemist, factory superintendent and industrial sales manager.

In 1940 he left Duluth to become technical service representative for the National Lead's Pigment Div. in Cincinnati and later joined Newport Industries and was assigned to Cincinnati and Chicago.

After the war Anderson moved to the West Coast to serve as regional sales manager for Nuodex Products at San Francisco. He later joined California Flaxseed Products Co. in Los Angeles, with whom he remained until accepting his present position with ADM.

Dr. J. J. Russell Joins Midland Industrial Finishes

Maintaining the policy of improving and expanding the technical staff, Mr. E. O. Robson, President of the Midland Industrial Finishes Company, announces the addition to the laboratory staff of Dr. John J. Russell as Director of Special Research with particular emphasis in the field of silicone chemistry.

•

Associate Research Director Named at Plaskon

The appointment of Dr. John B. Davidson as an associate director of research was announced by M. H. Bigelow, technical director of the Plaskon Division, Libbey-Owens-Ford Glass Company. Dr. Davidson will supervise research problems pertaining to industrial chemicals, silicones, glues and industrial resins.

PAUL A. O'NEILL

Hercules Powder Co. Announces Changes

Hercules Powder Company announced the appointment of Paul A. O'Neill as St. Louis sales representative for the company's Naval Stores Department. He will replace Joseph M. Carbonara, who has been transferred to the Export Department in Wilmington to handle sales of Hercules products in Cuba, Venezuela, Mexico, and Colombia.

E. Milton Regier will replace Mr. O'Neill. Mr. Regier has been associated with Hercules since 1941, working principally in the Vinsol Resin Sales and Market Research Division out of Wilmington.

•

Douglas Aircraft Using Hot-Spray Lacquer

Douglas Aircraft Company is now using hot-spray lacquer for finishing many metal parts, including aluminum, at the El Segundo, California plant. They say finishing time has been cut in half by the new process.

According to a report sent to Hercules Powder Company, manufacturers of the nitrocellulose ingredients from which lacquers are made, the use of hot-spray lacquer is growing steadily at Douglas. Their process engineers report a time saving equivalent to 27 and a half hours in finishing AD-4 airplanes has been realized. Booth time alone was cut nine hours, or one third, with present crews and equipment. Where two coats of finish were required before, one coat of hot lacquer now gives the required film thickness. This eliminates "scuff sanding" and the hazard of sanding through the finish on rivet heads and skin laps. In turn, this affords better protection in service.

In addition to the time saving factor, Douglas engineers reported the hot-spray lacquer process saved the equivalent of two gallons of lacquer and eight gallons of thinner per plane.

Thorough tests, to meet Navy specifications, proved to Douglas that hot-sprayed lacquer has better flow-out, decreases tendency to sag, blush or orange peel, and provides a smoother, glossier appearance. Salt spray and weatherometer tests showed the hot-sprayed film to be superior.

The reduction of finishing time by an estimated 50 per cent resulted in a definite increase in production, accompanied by a cut in finishing costs.

William J. Wilson Joins Deeks & Sprinkel Co.

Mr. William J. Wilson has recently joined the Deeks & Sprinkel Co., in Atlanta, Ga. Mr. Wilson was formerly employed by the E. Shannon Co. of Cincinnati. He was in charge of their varnish plant doing formulation. He is also present treasurer of the CDIC Production Club.

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Shell Chemical Announces Ethyl Chloride Addition

In a move to increase the supply of tetraethyl lead and ethyl cellulose, Shell Chemical Corporation will expand its ethyl chloride production capacity, it was announced by Jan Oostermeyer, president. The new addition going in at Houston has Government approval.

SAMUEL O. SORENSEN

S. O. Sorensen Elected Director of ADM

Samuel O. Sorensen has been recently elected to the board of directors of Archer-Daniels-Midland.

Mr. Sorensen joined ADM as a chemist in March 1923. During the following years he served successfully as chief chemist, technical director, and in 1947 was named vice-president in charge of research.

•

Sorbitol Availability Improved

Sorbitol availability has improved steadily during the past several weeks, according to a statement by K. E. Mulford, general manager of the Atlas Powder Company's industrial chemicals department, Wilmington, Delaware, and Atlas is now supplying all current demands for sorbitol. Mr. Mulford added that, while the new plant scheduled for completion late this year was not yet finished, various sections of the new facilities had been cut into the existing plant during August, greatly increasing capacity.

The new production is especially important at this time due to the essentiality of sorbitol in the defense program. Listed as a strategic material by the Munitions Board, it has been in critical supply along with glycerin and the glycols, and the new supply will at least partly alleviate this supply situation until the expanded production facilities are complete, Mr. Mulford said.

Reichhold to Manufacture Synthetic Resins in Brazil

Henry H. Reichhold, Chairman of the Board of Reichhold Chemicals, Inc., New York City, announced recently the signing of an agreement whereby RCI's complete line of synthetic resins for the paint and varnish, plywood, paper and textile industries will be manufactured in Brazil by Resana S. A. Industrias, Quimicas, Sao Paulo.

A new plant, incorporating the latest resin manufacturing techniques employed in Reichhold operations in the United States and Europe, will be erected by Resana on the outskirts of Sao Paulo with the assistance of RCI engineers.

•

Plaskon Sponsors Fellowship

The sponsoring of a graduate fellowship at Carnegie Institute of Technology by Plaskon Division, Libbey-Owens-Ford Glass Company, has been announced by M. H. Bigelow, technical director of Plaskon Division.

The fellowship, which will begin this month and continue for one year, is concerned with work on the synthesis of 3,3′, 5,5′-tetrafluorohydrazobenzene. Samuel Allen Heininger is the recipient of the fellowship and will carry out his activities under the direction of Professor Robert B. Carlin, in the Carnegie Tech chemistry department, headed by Dr. Frederick D. Rossini.

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Brazil Oiticica Inc. Names California Representative

Brazil Oiticica is now being represented in the Greater Los Angeles area and Southern California by the Thomas B. Carpenter Co., 4350 E. Washington Blvd. in Los Angeles.

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Plaskon Sponsors Fellowship

The sponsoring of a graduate fellowship at Carnegie Institute of Technology by Plaskon Division, Libbey-Owens-Ford Glass Company, has been announced by M. H. Bigelow, technical director of Plaskon Division.

The fellowship, which will begin this month and continue for one year, is concerned with work on the synthesis of 3,3′, 5,5′-tetrafluorohydrazobenzene. Samuel Allen Heininger is the recipient of the fellowship and will carry out his activities under the direction of Professor Robert B. Carlin, in the Carnegie Tech chemistry department, headed by Dr. Frederick D. Rossini.

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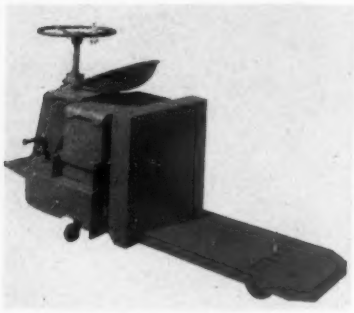
Brazil Oiticica Inc. Names California Representative

Brazil Oiticica is now being represented in the Greater Los Angeles area and Southern California by the Thomas B. Carpenter Co., 4350 E. Washington Blvd. in Los Angeles.

P&V NEW PRODUCTS & IMPROVEMENTS

A MONTHLY MARKET SURVEY



MARKET FORGE CO.

LIFT TRUCK

Narrow Type

To suit special applications, the new Load-Mobile electric lift truck is equipped with a narrow lifting platform. The width of the platform is only 18″ and can be furnished in 6″, 7″, 9″ and 11″ lowered heights to engage conventional platforms. These trucks have been built as narrow as 15″ to meet special conditions.

The truck is battery-operated and features 3-way operating positions which provide safety, comfort and maneuverability. Market Forge Co., Everett, Mass. PVP—November.

DRUM DECAL

Washable and Colorfast

With no metal priority for returnable containers, manufacturers are solving the problem of how to get them back with durable decals. Decal-marked containers keep coming back, they explain, because decal identification is colorful, sure, and lasting.

Any metal, glass or composition returnable container can be permanently identified with decal nameplates applied to any rough, smooth or crinkled surface, flat or curved. Among the decals available are type C and G mar-proof decals, designed for high resistance to abrasion, moisture and temperature extremes. Mar-proof decals, now also fungus-proof, are not affected by acid, alkali, alcohol or petroleum products—a vital factor in cleaning or reconditioning of containers for re-use, according to the manufacturer.

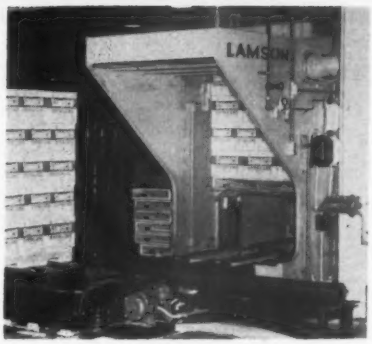
Further information on Decal Nameplates may be obtained by writing The Meyercord Co., 5323 W. Lake Street, Chicago 44. PVP—November.

VISCOSIMETER

Inexpensive

Zahn viscosimeter operates on the principle of allowing the liquid to be tested to flow through a calibrated orifice in bottom of metal cup. Test can be made in 20–40 seconds. Used wherever quick viscosity determinations are needed in the broad medium viscosity range. Henry A. Gardner Laboratory, Inc., 4723 Elm St., Bethesda 14, Md. PVP—November.

NEW PRODUCTS



LAMSON

PALLET LOADER

For Immediate Storage

Automatic pallet loader arrangement for intermediate storage of pallets awaiting removal after being loaded has been designed. The new arrangement now makes it possible to accumulate up to six loaded pallets while waiting for a fork truck to return from the stacking area. Without this arrangement, the truck might not return in time to remove loaded pallets as they are discharged, and automatic loading operations would be delayed.

Loaded pallets are pushed off the Pallet Loader's discharge conveyor and onto a second conveyor at right angles to the discharge. Automatic tripping mechanisms operate a ram which pushes the loaded pallet onto the right-angle storage conveyor.

For further information on the use of the pallet loader for handling specific types and sizes of containers, write the Lamson Corporation, Syracuse, N. Y. PVP—November.

ANALYSIS UNIT

Improvement in Design

The new Norelco Fluorescence Analysis Unit incorporates many design improvements to facilitate rapid qualitative and quantitative analysis of constituents in metals, alloys, minerals, ores, chemical mixtures and compounds.

The company introduced the first Fluorescence Analysis equipment to the market in 1948 and the present model reflects many new ideas acquired as the result of field testing and experience. North American Philips Co., Inc., 750 South Fulton Ave., Mt. Vernon, N. Y. PVP—November.

SILICA ACQUASOL

For Water-Based Finishes

Basic silica micelle of Syton C-30 possesses a weak negative charge. This coupled with the large surface area of the unit particle and the reactive nature of the surface accounts for the binding effect that this material exhibits in certain systems. Spherical shape of the unit colloidal particle accounts for the low viscosities of relatively concentrated solutions and for the properties it imparts to paper and other materials. According to the manufacturer, this material lends excellent skid resistance and high gloss to aqueous waxes, decreases tack and controls gloss in water based finishes, also will aid suspension of pigments in aqueous systems. Monsanto Chemical Co., Merrimac Div., Boston 49, Mass. PVP—November.

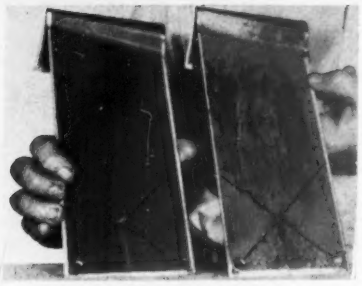
INSECTICIDE

For Mixing With Paint

Insecticide, dichlorodiphenyl dichloroethane, is mixed with inactive material and sold for mixing with paint before application. According to the manufacturer, this insecticide does not dissolve but becomes suspended in paint and is said to retain its effectiveness four to five years.

It can be used with most types of interior and exterior, including oil, water, and dry paints, as well as white-wash, casein, cement and stucco paints. Dianol Sales Corp., Allentown, Pa. PVP—November.

NEW PRODUCTS



GENERAL ELECTRIC

ALKYD RESIN

Versatile Type

Designated as G-E Glyptal 7422, the new paint resin is a short, pure, oil-modified alkyd, free of rosin, phenolic, styrene, or other modifiers. It possesses drying speed formerly unattainable in straight oil-modified alkyds. Exceedingly versatile, the resin is recommended for a variety of industrial finishes requiring fast air-dry or very rapid bake. It has excellent color retention, adhesion, toughness, mar resistance, and salt spray resistance.

Recent exposure tests on gloss paints in New York and Florida show that Glyptal 7422 has higher gloss retention and chalking resistance than any other Glyptal alkyd resin of similar oil length.

G.E.'s new vehicle also produces high-quality primers for metal. It dries quickly to an insoluble film that is not lifted by succeeding coats, and can be used to meet the very rapid dry and rigorous performance requirements of aircraft primer specifications MIL-6889-A without the use of phenolic dispersion resins.

See above photo: The panel on the right, coated with a popular alkyd primer, is rusted and corroded. Panel on the left is a primer formulated with Glyptal 7422 and resists deterioration from salt water. Test conducted was the ASTM standard salt spray—20% salt solution, run at 95 degrees F for 300 hrs. General Electric Co., Chemical Dept., Pittsfield, Mass. PVP—November.

VINYL STABILIZER

Paste Form

Heat and light stabilizer for polyvinyl cheloride resins and their copolymers is recommended for fabric coatings, solvent solutions, organosol and plastisol dispersions and calendering of clear and pigmented films. Material is supplied as a paste and can be easily incorporated readily during cold or hot milling on a 2-roll rubber mill, 3-roll paint mill, universal mixer or in a Banbury mixer.

According to the manufacturer, this stabilizer improves the resistance of polyvinyl chloride resins against the deteriorating action of heat and ultra-violet rays; and serves as a satisfactory hydrochloric acid acceptor when decomposition takes place. Stabilizer is compatible with all pigments used with these resins and does not affect the shade of these pigments. Known as Stabelan G-1, this product is available from Harwick Standard Chemical Co., 60 S. Seiberling St., Akron, Ohio. PVP—November.

ROOF EXHAUSTER

Has Reversing Direction

Mushroom Power Exhauster is used for roof ventilating application. Can also be used as a fresh air supply unit by simply reversing direction of flow. Squat mushroom-type diffuser head, acrodynamically designed, reduces turbulence and discharge losses to a minimum, according to the manufacturer. For further details, write to the Chicago Blower Corp., 4558 West Congress St., Chicago 24, Ill. PVP—Nov.

PATENTS

Conducted by

Lancaster, Allwine & Rommel

PATENTS AND COPYRIGHTS

424 Bowen Building,
Washington, D. C.

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired to Lancaster, Allwine & Rommel.

Phenolic Color Formers

U. S. Patent 2,537,138. Andrew Bradshaw Jennings, New Brunswick, N. J., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware.

The process which comprises reacting two compounds in substantially equimolecular proportions, namely, a monohydric phenol taken from the group consisting of alpha-naphthol, o-hydroxydiphenyl, thymol, 1-naphthol-5-sulphonic acid, m-cresol, 2,4-dichloronaphthol, xylenol, and 2,6-dibromophenol with a compound of the general formula:

$$ROCH_2NH—R_2—NHCH_2OR_1$$

where R and R_1 are taken from the group consisting of methyl and ethyl and R_2 is selected from the groups consisting of

$$—\overset{O}{\overset{\|}{C}}—,\quad —\overset{O}{\overset{\|}{C}}(CH_2)_n—\overset{O}{\overset{\|}{C}}—$$

where *n* is a cardinal number from 1 to 8 at a temperature from 0 to 50° C. in the presence of a water-miscible alkanol and a mineral acid condensation catalyst.

Coating Composition

U. S. Patent 2,537,136. Albert C. Henn, Linden, and Albert Gathman, Elizabeth, N. J., assignors to Standard Oil Development Company, a corporation of Delaware.

A coating composition for flexible and non-flexible base materials comprising as essential film-forming materials (1) a copolymer consisting of the copolymerization product of a secondary alkyl half ester of an ethylenc α,β-dicarboxylic acid selected from the group consisting of maleic and fumaric acids, in which the alkyl group contains from 4 to 12 carbon atoms, and a polymerizable vinyl compound having the structural formula: $R—CH=CH_2$, where R is a radical selected from the group consisting of phenyl, halogen substituted phenyl and methyl substituted phenyl radicals, said dicarboxylic compound and said vinyl compound being copolymerized in a molal ratio of about 1:1 to 1:2, and (2) an aminoaldehyde thermosetting resin selected from the group consisting of urea-formaldehyde, alkylated urea-formaldehyde, melamine-formaldehyde and alkylated melamine-formaldehyde resins, said copolymer constituting a major proportion and said thermosetting resin constituting a minor proportion of said essential film-forming materials; and a solvent for the foregoing ingredients.

Oleoresinous Varnishes

U. S. Patent 2,550,961. John J. Bradley, Jr., Winchester, Mass., assignor to Boston Varnish Company, Everett, Mass., a corporation of Massachusetts.

The process for the production of an oleo-resinous varnish of improved color and drying characteristics which comprises forming a solution or dispersion in a hydrocarbon solvent of an oil-soluble varnish resin and an unsaturated glyceride drying oil, the weight of the solvent being from 30% to 2400% of the weight of the resin, and the oil present containing on the average more than 5.5 double bonds per molecule of oil, of which at least 15% are in conjugated position, and a coordination complex of boron trifluoride and an organic compound selected from the class consisting of ethers, alcohols, acids, and ketones equivalent to 0.25% to 4.0% by weight of boron trifluoride based on the varnish nonvolatile content, maintaining

said mixture at a temperature in the range 60° F. to 100° F. for less than 4 hours and until the viscosity reaches a varnish consistency, adding a basic substance to the resulting varnish in an amount sufficient to react with substantially all of the boron trifluoride-organic compound coordination complex present in the mixture, and removing the reaction product from the varnish.

Paint Remover

U. S. Patent 2,548,766. Nathaniel L. Baum, Los Angeles, Calif., and Jean Wynkoop, Brooklyn, N. Y., assignors to Turco Products, Inc., Los Angeles, Calif., a corporation of California.

A thixotropic water dispersible paint remover, comprising a thixotropic dispersion of a protein colloid in a paint remover solvent, and an organic amine, said dispersion of the protein being in a mixture of a liquid chlorinated hydrocarbon solvent and mutual solvent modifier taken from the group consisting of the aliphatic alcohols and aliphatic ether alcohols and water dispersed in said solvent, said liquid chlorinated hydrocarbon solvent being in preponderate proportion, and said water being in the range of about 1% to about 20% by weight of said thixotropic paint remover, and said dispersion being thixotropic so that on agitation said mixture is a fluid and when at rest is a gel having the property of adhering to painted surfaces without substantial running and dispersible in water so that it may be washed from a surface to which it is applied.

Aqueous Dispersion of a Pigmented Alkyd Resin

U. S. Patent 2,543,211. William A. Waldie, Dayton, Ohio, assignor to The Commonwealth Engineering Company of Ohio, Dayton, Ohio, a corporation of Ohio.

In a method of preparing a coating composition in the form of an emulsion, the steps of forming an alkyd resin by the reaction of glycerin with a compound selected from the group consisting of phthalic acid, maleic acid, phthalic anhydride and maleic anhydride, and during polymerization mixing into the reaction product a fatty acid coated pigment, heating the mixture to approximately 450° F. to react the fatty acid with the alkyd resin, said fatty acids, pigment and resin being present in the proportion by weight of approximately 1 : 2 : 2, adding to the pigmented resins an aqueous mixture of ethylene glycol monoethyl ether and casein, agitating the mixture to emulsify and to disperse the pigmented resin when said mixture is at a temperature of approximately 250° F.

Blending Wax Compositions

U. S. Patent 2,559,645. Robert G. Larsen, Albany, Calif., and August A. Schaerer, Amsterdam, Netherlands, assignors to Shell Development Company, San Francisco, Calif., a corporation of Delaware.

The method of preparing a wax composition containing an ethylene polymer having an average molecular weight of from about 6,000 to about 140,000 which comprises; forming a homogeneous blend of an ethylene polymer having an average molecular weight of from about 6,000 to about 140,000 with approximately an equal amount of an amorphous petroleum wax having a melting point between about 40° C. and about 88° C. at a temperature above the melting point of said wax and then incorporating with said blend at a temperature above the melting point of said wax an additional amount of said wax to obtain a homogeneous wax composition.

Polytetrafluorethylene Coating Compositions

U. S. Patent 2,562,118. Le Verne Kenneth Osdal, Upper Darby, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del., a corporation of Delaware.

A coating composition comprising, as its essential constituents, an aqueous suspensoid of a polymer of tetrafluoroethylene and 1–90% of acid, based on the combined weight of polymer and acid, said acid consisting of chromic acid and phosphoric acid in a ratio of between 10:90 parts and 90:10 parts.

Synthetic Wax

U. S. Patent 2,560,773. Stanley P. Lovell, Newtonville, Mass., assignor to Lovell Chemical Company, Watertown, Mass., a corporation of Massachusetts.

A yellowish brown wax having a melting point of approximately 216° F., specify gravity of 0.9307 and which is soluble in hot hydrocarbon solvents but not soluble in cold condition, and which is made by heating molten polyethylene and a microcrystalline petroleum wax prepared by oxidizing petroleum tankage together at a temperature approximating 400° F. and in the proportions approximating 35–7% polyethylene to 65–93% wax.

Vegetable Oil Compounds

U. S. Patent 2,565,654. Edward M. Geiser, Downers Grove, Ill., assignor to Universal Oil Products Company, Chicago, Ill., a corporation of Delaware.

A process for the production of resinous and elastomeric materials which comprises cobodying from about 1 to about 3 molecular proportions of an unsaturated fatty acid ester drying oil and 1 molecular proportion of a hydrocarbon drying oil containing polyolefinic unsaturation in which at least some of the unsaturated bonds are in conjugated relationship, and thereafter reacting said cobodied mixture of drying oils with a carbonyl compound selected from the group consisting of the aldehydes and ketones at condensation reaction conditions and in the ratio of said carbonyl compound to said cobodied mixture of from about 0.1 to about 3 molecular proportions.

Emulsion Paint

U. S. Patent 2,563,991. Emile Vital Damboise, Paris, France.

A process for preparing an emulsion paint, which comprises grinding a white pigment in a drying vegetable oil, grinding a white pigment in water in the presence of a protecting hydrophilic colloid, forming an emulsion by mixing the oily and aqueous suspensions thus obtained, grinding a colored pigment in a vegetable drying oil, grinding a colored pigment in water, and then incoporating the resulting oily colored suspension and aqueous colored suspension to said emulsion.

Drying Oil Composition

U. S. Patent 2,565,685. Mortimer T. Harvey, South Orange, N. J., assignor to Harvel Research Corporation, a corporation of New Jersey.

The method comprising heating together at about 400° F.–650° F. a fatty oil and an organic reaction product obtained by reacting under alkaline conditions furfuraldehyde and mesityl oxide in the mole ratio of 1–1.3 moles of furfuraldehyde to 1 mole of mesityl oxide, the ratio of said oil to said reaction product being in the range of 98–2 to 10–90.

Coatings from Soybean Oil

U. S. Patent 2,550,703. Arthur J. Lewis, Helen A. Moser, and John C. Cowan, Peoria, Ill., assignors to the United States of America as represented by the Secretary of Agriculture.

A paint composition consisting essentially of normal soybean oil as the principal oil vehicle, calcium oxide, basic carbonate of white lead, and a drier, the calcium oxide being present in an amount within the range of 4 to 10 percent of the total weight of calcium oxide and basic carbonate of white lead, the ratio of said total weight to weight of oil vehicle being about 3:1.

TECHNICAL Bulletins

CHEMICALS

12-page bulletin lists important uses and applications of Pittsburgh Coke & Chemical Company's products including their specifications. Sections are devoted to company's Coal Chemicals' Plasticizers, Activated Carbons, Protective Coatings and Agricultural Chemicals Divisions. Pittsburgh Coke & Chemical Co., Grant Bldg., Pittsburgh 19, Pa.

DRUM CLEANING

The Pangborn Corporation, Hagerstown, Md., offers a new six-page two-color brochure on fast, low-cost drum cleaning. Including 5 photographs, 11 line drawings, and 4 plan and elevation drawings, the bulletin explains how Pangborn's Rotoblast technique thoroughly cleans drums and covers by throwing metallic abrasives against drum surfaces by centrifugal force. Two available Rotoblast machines are featured, one having a capacity of 70 drums per hour, the other a capacity of 140 drums per hour. Ask for Bulletin No. 220.

LACQUER INFORMATION

Leaflet contains information on lacquer and pointing out that lacquer formulations will be considered for military applications even where synthetic enamels are now specified owing to the better availability of lacquer and the possible advantages of the hot-spray process. Hercules Powder Co., Wilmington, Del.

VISCOSITY

Ten page catalog describes instruments for continuous measurement, recording, and control of viscosity. Relative heights of two floats, one susceptible to viscosity change, the other viscosity immune in a tapered tube in which the fluid is an indication of viscosity. Direct view instruments measure viscosity up to 230 kinedynamic units at flow rates up to 4.5 gal./min. Other instruments for measurements up to a million centipoises. Fischer and Porter Co., Hatboro, Pa.

EXTINGUISHER GUIDE

This new two-color, 12″ × 22″ poster, which quickly tells employees the correct fire extinguisher to use on rubbish, wood, inflammable liquid or electrical type fires, has just been released by Randolph Laboratories, Inc., 8 E. Kinzie St., Chicago, Illinois.

ALUMINUM PIGMENT

Bulletin No. 513 describing MD 565W Aluminum Paste and its use in the pigmentation of aluminum paints, has been issued by Metals Disintegrating Company, Inc., Elizabeth, N. J., manufacturers of metal pigments, metal powders and metal abrasives.

MD 565W is described as an ideal pigment for use in aluminum paints for industrial and maintenance use.

It meets Federal Specification TT-A-468a, Type II, Class B, and A.S.T.M. Spec. D 962-49, Type II, Class A.

PAINT FORMULATIONS

Twelve new paint formulations produced to specifications as laid down by hundreds of the nation's

leading painting contractors, painters and maintenance men are described in a 15-page booklet published by the Painter Maintenance Sales Div., The Sherwin-Williams Co., Cleveland, Ohio.

MIXER SELECTION

16-page bulletin gives curves and engineering data needed to specify mixing requirements. Various types and models are shown with specifications. Special designs are recommended where problems of the material to be handled require them. International Engineering, Inc., Dayton 1, Ohio. Ask for Bulletin 74.

PLATY EXTENDER IN VINYL–ALKYD PAINTS

Technical Bulletin No. 9 issued by the Wet Ground Mica Association, Inc., 420 Lexington Ave., New York 17, N. Y. deals with an Investigation of the Effect of the Behavior of Vinyl-Alkyd Paints. The report gives the results of the tests on one of those paints in which mica had been used in varying quantities. The paint has been investigated alone rather than as a part of a paint system.

PHOSPHORESCENT AND FLUORESCENT PIGMENTS

Properties of various pigments such as color, afterglow, flourescence, specific gravity, etc. are tabulated in this chart. Suggested applications are also given. Rhode Island Laboratories, West Warwich, R. I.

ORGANIC CHEMICALS

Latest edition of annual booklet contains 16 pages of physical properties of synthetic organic chemicals. Over 300 products are covered. Carbide and Carbon Chemicals Co., Div. of Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

TRUCK ATTACHMENT

Photos and drawings show how two simple adjustments, without tools, change the carriage from a fork-spacer and clamp to a side-shifter to give you a four-way carriage. Bulletin 1350-1, released by Baker Industrial Truck Division of The Baker-Rauling Company, Cleveland 2, Ohio, describes and illustrates the new Baker 4-purpose carriage.

ARALDITE RESINS

Technical manual describes the physical and chemical properties of "Araldite" ethoxyline resins. The illustrated manual also states the recommended procedures for using the product. The Ciba Co., 627 Greenwich St., New York 14, N. Y.

ELECTRIC HEATERS

Bulletin covers complete line of "packaged" electric heaters. These immersion heaters and circulation heaters are widely used in heating oil, melting lanolin, paraffin, greases and viscous fluids. Edwin L. Wiegand Co., 7500 Thomas Blvd., Pittsburgh 8, Pa.

STABILIZER HANDBOOK

Revised data book on stabilizers known now as the "Ferro Stabilizer Handbook" is being published by the Ferro Chemical Corp., Bedford, Ohio.

MIXERS and STIRRERS

Six-page folder describes industrial mixers, designed to be clamped to open head drums, barrels or tanks while mixing fluids, suspensions and emulsions. Air-driven explosion proof types are also discussed. Grenier & Co., Inc., 1521 Union St., Harvey, Ill.

MATERIALS HANDLING

Efficient handling of raw and finished materials, their proper storage, and how modern materials handling machines can expedite manufacture to cut costs, save time and money, is the theme of the newest Clark booklet, "Basic Facts About Materials Handling."

How to combine small units into big ones for more efficient handling, how to route materials, how to utilize "over-head" space for storage, how to use trailer trains, and how to best make use of a limited manpower force are a few of the subjects discussed in the booklet. Filled with down-to-earth specifics, the booklet should prove of great value to anyone who faces materials handling problems. Clark Equipment Co., Battle Creek, Mich.

FORK TRUCKS

Baker Industrial Truck Division of The Baker-Raulang Co., 1250 W. 80th St., Cleveland 2, Ohio, has released a new 8-page specification bulletin number 1326 which includes user benefits of the major components of its line of type FC fork trucks which are available in capacities of 3000, 4000 and 6000 lbs.

METAL CLEANER CHART

Selection chart lists various phosphoric acid metal cleaners and rust removers according to strength, temperature limits, rust and oil removal, etc. Concise information on the sequence of operation and equipment required in each process is also given. American Chemical Paint Co., Ambler, Pa.

HOT SPRAYING

Martin-Senour Automotive Refinishing Laboratories, 2520 S. Quarry St., Chicago have made an extensive study of hot spray application. Both advantages and disadvantages found in these tests are described in a booklet prepared by the company. The booklet, entitled "The Hot Issue" is a complete compendium of technical information on the hot spray technique.

MILLS & MIXERS

Troy Engine & Machine Co., Troy, Pennsylvania, has issued a new General Catalog (No. GP-51) describing the Troy Line of 1 Point Control and 4 Point Control Roller Mills, 3-Zone Action Colloid Mills, and Angular Mixers.

GERMAN RESIN DATA

A bulletin of unusual interest which lists a large number of recent German inventions in the field of plastics and synthetic resins has just been published by Research Information Service, 509 Fifth Avenue, New York City. The Bulletin "Synthetic Resins" No. 56 listing English translation of patent applications filed by Germany's foremost chemical manufacturers, includes the latest postwar data.

The subjects covered by these Reports are exceptionally timely and of immediate concern to all research workers and development engineers in the synthetic resin industries.

SPRAY PAINTING

"Sprayways," a graphic 16-page rotogravure brochure introduced by the DeVilbiss Co., is distributed to industrial executives, distributors, jobbers, libraries, schools, technical organizations and others interested in the varied uses of spray painting equipment.

Nearly 100 photographs have been incorporated in the publication to graphically display the many spray equipment uses. The photographs are

actual scenes taken in industrial plants, on the farm, in shipyards and in many other places where spray painting equipment is being used. DeVilbiss Co., Toledo, Ohio.

PRESERVATIVES

This booklet discusses in some detail the use of two naphthenates to protect cellulosic materials against mildew, rot and fungus damage. Copper and zinc naphthenates preserve wood products generally, textiles made from cotton, linen, jute and hemp, and any other fibers of cellulosic structure. Requests for free copies of "Oronite Copper and Zinc Naphthenates as Preservatives" should be addressed to Naftone, Inc., 515 Madison Ave., New York 22, N. Y.

PLASTICIZER

Bulletin gives physical properties of orth-nitrobiphenyl and contains suggested formulations of various resins and suppliers of materials in addition to chemical and test data. Monsanto Chemical Co., St. Louis, Mo.

FORK TRUCK

Eight-page Bulletin 1327, released by Baker Industrial Truck Division of The Baker-Raulang Company, shows you all the important construction and operating features of the new Baker type FS 2000 pound fork truck.

COLORIMETER

Twenty-page bulletin features photoelectric instrument of colorimetry and nephelometry which is also adaptable for the measurement of fluorescence and the reflection; the construction of the unit as well as that of accessories is explained. Photovolt Corp., 95 Madison Ave., New York 16, N. Y.

MIXER

Bulletin is devoted to "Dispersall" mixer for dispersing, emulsifying and milling in one operation—applicable to all kinds of fluid mixes from thin slurries to pastes; information on applications of mixers, specifications, fields using them plus performance data are also given. Abbé Engineering Co., 56 Church St., New York 7, N. Y.

CORROSION

Bulletin lists purpose, characteristics, and effectiveness of surface treating chemicals. American Chemical Paint Co., Ambler, Pa.

LAB STIRRER

Six-page bulletin features a 1/6 hp air powered explosion-proof, lab mixer which delivers high power due to the fact that it is geared down to 10 to 1. The bulletin also describes and illustrates direct drive, geared, side entering, flange-mounted and other industrial models. Grenier & Co., Inc., P. O. Box 417, Palos Heights, Ill.

CLASSIFIED ADVERTISEMENTS

Rates: $.20 per word, except those seeking employment, for which rate is $.10 per word. Minimum: ten words. Address all replies to Box Number, c/o Paint and Varnish Production, 855 Avenue of the Americas, New York 1, New York.

FOR SALE

NAPHTHALENE REFINED AVAILABLE. REGULAR QUANTITY SHIPMENTS — REASONABLE — CONSUMERS Box 119.

A. R. JAMESON

Jameson Chemical Co. Formed

A. R. Jameson, until recently first vice president of the Velsicol Corp. announced the formation of his own firm, Jameson Chemical Co. with offices at 218 East Huron St., Chicago.

The new firm will supply on a national scale, chemical raw materials manufactured to specification.

Sales manager as well as vice president of Velsicol for the past 12 years, Mr. Jameson was associated with that firm from September, 1935 until his resignation recently.

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G. P. Turner Appointed Supt. Of Devoe and Raynolds

George P. Turner, Jr., has been appointed plant superintendent of Devoe & Raynolds Company, Inc., at their 086 plant in Louisville, Ky., it was announced by Basil Howell, General Production Manager.

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New Toluol Production at O & C

Toluol in bulk and tank-car quantities is now in full production at Oil and Chemical Products Co., Inc. Currently in short supply, Toluol is a popular solvent as well as a basic material in many industrial and pharmaceutical manufacturing processes.

The company has recently completed a large refinery and plant located at Galena Park in Houston, Texas.

Hercules Powder to Exhibit At Chemical Exposition

Versatile nonionic surface-active agents which add valuable properties to detergents, synthetic resins to simplify varnish making, and a fortified rosin size for paper are among the recent product developments which will be exhibited by Hercules Powder Company at the Exposition of Chemical Industries in New York, November 26–December 1.

Other chemical products which Hercules is exhibiting include toxaphene, the base for many agricultural insecticide formulations; pine oil, turpentine, and other rosin and terpene derivatives; a number of synthetic resins; cellulose acetate and nitrocellulose.

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Dr. H. L. Maxwell Elected Officer of A. S. T. M.

Dr. Harold L. Maxwell, supervisor of general consultants, E. I. du Pont de Nemours & Company, Inc., Wilmington, Del., has been elected a vice-president of the American Society for Testing Materials by the board of directors, to fill a vacancy that existed in the board. He will serve as a vice-president through the Society's 50th Anniversary Meeting in New York City, June, 1952.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, AND CIRCULATION REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233) of PAINT AND VARNISH PRODUCTION, published monthly at Lancaster, Pa., for October 1, 1951.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: John Powell, 855 Avenue of the Americas, New York City.
Editor: Anthony Errico, 855 Avenue of the Americas, New York City.
Managing editor: None
Business manager: None

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

Powell Magazines, Inc., 855 Avenue of the Americas, New York City.
John Powell, 855 Avenue of the Americas, New York City.
Ira P. MacNair, 254 W. 31st Street, New York City.
Alice L. Lynch, 855 Avenue of the Americas, New York City.

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5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only).

JOHN POWELL, Publisher.

Sworn to and subscribed before me this 20th day of September, 1951
(SEAL)

Daniel D. Randall.
Notary Public, State of New York
No. 03-8491000
Qualified in Bronx County
Certs. filed with Bronx and New York
County Clerks and Registers
(My commission expires March 30, 1952)

abstracts

New Drying Oils

Potts, William H. Presented at the Sixth Annual Southwest Regional Meeting of the American Chemical Society in San Antonio, Texas.

Shrubs that now grow wild in Texas and several other states can provide a profitable new industry for the Southwest if cultivated as sources of drying oils.

Among the oil-bearing plants native to the region which merit particular attention, Professor William M. Potts of the Agricultural and Mechanical College of Texas reported, are the shrubs called Perilla and Queens Delight, and the Chinese tallow tree. The characteristics of these and other potential sources of drying oils for use in paints, varnish and lacquers were evaluated in the College Station laboratory of Dr. Potts, who is a professor of chemistry.

"It should be possible," said Professor Potts, "to grow the Queens Root, or Queens Delight (*Stillingia sylvatica* L.,) as a row crop and harvest it by mechanical harvester. It grows to a height of three to four feet. It flowers in May and fruit begins to ripen in July."

The whole seed of this shrub, he stated, contains 30 per cent oil, which may be extracted by conventional methods. Of interest, however, is the root as well as the seed of Queens Delight. The root contains oil, a resin, and a glucoside. The glucosides are chemical compounds frequently found in plants which may serve as starting points for the synthesis of several important products. The extract, Professor Potts continued, has some medical applications, as an expectorant, emetic and cathartic in large doses.

Even richer in oil than Queens Delight, according to Professor Potts, is the seed of the shrub *Sebastiana lingustrina,* the oil content of which often reaches 37 per cent. Both of these shrubs are members of the class known as the Euphorbiaceae.

In analyzing and evaluating data on the oil from the seed of the Chinese tallow tree, the speaker found that it is a superior drying and polymerizing oil. A polymerizing oil is one that easily forms long heavy molecules by combining with itself or some other substance. A common example is the copolymerization of styrene with butadiene to form one type of synthetic rubber.

If the Chinese tallow tree were to be cultivated as a crop, Professor Potts suggested, 150 to 160 tallow trees should be grown on each acre. That number of trees would yield about twelve hundred pounds of oil per acre, which would be worth about $200, he explained.

Also of interest, Professor Potts asserted, are the native and Chinese Perillas which grow luxuriantly around Saratoga, Tex. Perilla provides an exceptionally good drying oil because of what chemists term its high degree of unsaturation. This means that its chemical structure is such that air readily combines with it.

All the plants mentioned, he said, should serve as the basis for an oil seed industry in Southeast Texas, especially from Houston to Beaumont. However, he warned, a sponsor is needed to finance further investigations.

"This is a field that might well be thoroughly investigated by persons or organizations interested in developing this section," he declared.

Polyvinyl Chloride as a Lacquer Raw Material

Ballaban, Herbert. Chemiker-Zeitung, 1951 (75), 88.

While ordinary polyvinyl chloride has for a number of years become a very valuable raw material in the plastics industries, and after addition of suitable plasticizers in the production of foil, synthetic leather, floor lining, shoe soles, etc., re-chloridized varieties for use in varnishes and lacquers was introduced only a few years previous to World War II, when chlorinated rubber lacquers had just reached their peak. During the war the entire production of re-chloridized polyvinyl chloride was seized for military purposes, while during the first few years after the last war the lack of suitable high-grade solvents within Germany actually brought production of this material to a standstill. Conditions have now improved considerably, and the attention of producers and users are again centered on this valuable raw material for anti-corrosive lacquers of high mechanical resistance, and adherence, and maximum life even under

strenuous conditions of application.

Re-chloridized polyvinyl chloride lacquer films dry very rapidly and must be applied with a soft brush and spread out as quickly as possible. Setting commences within a few minutes. There are no wrinkling or folding tendencies. Linseed oil-red lead paints should not be used as primers. Better primers are polyvinyls chloride lacquers pigmented with red lead. A number of applications should be made to insure perfect nonporosity of the films. If these general conditions are correctly maintained, these lacquers films are preferable to practically all protective types of films including even the chlorinated rubber-lacquers, provided that pure re-chloridized polyvinyl chlorides are used for this purpose. Mixed polymers, which are often used on account of more favorable solvent properties, do not develop the same high degree of resistance toward moisture, alkaline and strongly acid materials. Even after considerable ageing, these polyvinyl chloride lacquer films exhibit unchanged mild gloss, a high degree of elasticity, resistance against impact and maximum corrosion resistance.

Pigments For Plasticized Vinyl Chloride Polymers

G. Wormald and W. F. Spengeman, E. I. du Pont de Nemours & Co., Newark, N. J. Presented before the Div. of Paint, Varnish and Plastics Chemistry of the American Chemical Society, Sept. 3–7, 1951, New York.

Colored pigments are chemical compounds capable of combining with, or being acted upon by, other ingredients normally employed in plasticized polyvinyl chloride systems. Optimum end-use properties can be attained only if consideration is given to the chemical and physical characteristics of the colorants being selected. A simplified classification of the commonly used colored pigments is presented; the peculiar properties of each type, in so far as their performance in plasticized polyvinyl chloride compounds is concerned, are discussed. It is suggested that a general knowledge of the chemical identity of a colored pigment may, in many instances, serve as a useful guide for predicting its crocking and migration tendencies as well as its color and chemical stability as influenced by other compounding ingredients such as the stabilizers and plasticizers.

Varnish Resins from Diazonium Salts and Hydrazin Compounds

Brintzinger, H., Pfannstiel, K. and Noeske, H. Farben, Lacke, Anstrichstoffe, 1950 4, 78.

By treating various diazonium compounds with sulfur dioxide (o-, m-, p-nitraniline, nitrotoluidin (CH_3:NH_2:NO_2 = 1:4:5 and 1:4:6) m-amino phenol, o-, m-, p-anisidin, 1-nitro-4-naphthylamin, 2-naphthylamin) as well as by oxidation of some hydrazin compounds in acid solution (especially sulphuric acid solution), the authors succeeded in producing technically useful resins. The experimental results indicate that the type and concentration of the acid solutions employed are of considerable influence on the results obtained.

The resins produced are refined by treatment with water vapor and by reprecipitation from glacial acetic acid or glacial acetic acid-azeton respectively. Since these resins are only partially soluble in methanol, it is supposed that they do not represent uniform substances. The article also contains information regarding the degree of compatibility of these resins with various varnish raw materials and the results of film tests.

CALENDAR OF EVENTS

Nov. 26–Dec. 1. Chemical Industries Exposition, Grand Central Palace, New York City.

Jan. 14–17, 1952. Plant Maintenance Show and Conference, Convention Hall, Philadelphia, Pa.

Mar. 3–7. Spring Meeting of ASTM, Hotel Statler Cleveland.

Mar. 6–7. Spring meeting of the Southern Paint and Varnish Production Club, Buena Vista Hotel, Biloxi, Miss.

April 3–5. First Pacific Coast Paint Material and Equipment Exhibit, Biltmore Hotel, Los Angeles, Calif.

Production Club Meetings

Baltimore, 2nd Friday, Belvedere Hotel.

Chicago, 1st Monday, Furniture Mart.

C. D. I. C., 2nd Monday.
Cincinnati—Oct., Dec., Mar., May, Cincinnati Club;
Dayton—Nov., Feb., April, Van Cleve Hotel;
Indianapolis — Sept., Claypool Hotel;
Columbus — Jan., June, Fort Hayes Hotel.

Cleveland, 3rd Friday, Hotel Auditorium.

Dallas, 2nd Thursday, No Fixed Place.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, Last Monday, El Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, Seven Seas Restaurant.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, Puritan Hotel, Boston.

New York, 1st Thursday, Building Trades Employers Assn.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, Annual Meetings Only.

Philadelphia, 3rd Wednesday, Engineers' Club.

Pittsburgh, 1st Monday, Fort Pitt Hotel.

St. Louis, 2nd Tuesday, Forest Park Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Diana Sweets, Ltd.

Western New York, 1st Monday, 40-8 Club, Buffalo.

NATIONAL CONVENTION

(*From page 32*)

of surface preparation, high tensile and elongation properties, two years minimum of weathering, and resistant to ethylene glycol.

Dr. E. E. Jukkola spoke on Air Force finishing requirements and these are covered in MIL-F-7179. Aircraft require special finishes of high quality; capable of withstanding abrasion during high speed flight, flexibility at temperatures of minus 65°, resistant to oils and hydraulic fluids. Use of hot lacquers are not anticipated in the immediate future.

Trade Sales Session

A stage presentation, showing how the sales tools of the industry can be utilized by every segment of the paint, varnish and lacquer industry was a highlight of this session. Vividly and graphically portrayed, this skit showed how the clean up, paint up and fix up campaign, the Associations' cooperative advertising program, and the Paint Power Sales Training are promoting the sales of protective coatings, and how increased sales can be realized if members of the industry will use these tools regularly.

The session concluded with a two part panel: "Paint Need Not Peel" and "The Mildew Problem".

Government Controls Symposium

Dr. W. A. Nyland; Chief Protective Coatings Branch, Chemical Division, NPA, outlined some of the problems that his branch has faced during the past few weeks. He said the aluminum, lead chemicals and phthalic anhydride will remain tight for some time. As for titanium dioxide, its production is linked up with sulfuric acid which at present is very tight and expected to remain so for at least 18 months. This will be a definite threat to titanuim suppliers.

Better supplies of napthalene will be an indication for more phthalic anhydride production. Much will depend on the petroleum industry to offer petroleum napthaline, ortho xylene at suitable prices. Presently phthalic anhydride is tight but there seems to be enough to meet existing demands.

Harvey P. Smith, of the Metal Container Section, Container and Packaging Division, NPA discussed in detail NPA order M-25. He also covered the problems connected with black plate gallon cans for packaging oil base paints. Short supplies of tin and steel are the main problems facing can manufacturers today.

Gregory J. Lanigan, Chief, Steel Drum Section, Containers and Packaging Division, NPA discussed Order M-75. He pointed out that in order to have a sufficient supply of containers, packers have initiated either a deposit system or put their returnable drums on a rotating basis. These methods have proven satisfactory and approximately 50 per cent of their drums are returned for re-use. It is interesting to note that if drums are re-used only one time in 1951, the over-all usage will be 140 per cent rather than 90 per cent.

George L. Prichard, Director, Fats and Oils Branch, Production and Marketing Administration, Dept. of Agriculture spoke on the present supply of oils and what can be expected in the immediate future. There is a surplus of linseed but castor and tung oil are in short supply. Domestic production of tung oil is adequate only to meet essential needs. Initial domestic plantings should increase castor bean acreage next year.

COATINGS MATERIALS

(*From page 27*)

We will use market research and sales research to a much greater extent.

We will handle our facts with mechanically operated equipment after reducing our data to condensed numerical form.

We will standardize our information into larger units and work with multiple units of information on an interchangeable basis like the tubes in our radio can be replaced and interchanged.

We will have increased cooperational research, development and marketing between companies of all sizes.

WE NEED YOUR EMPTY DRUMS

The problem of obtaining enough metal chemical containers to avoid shipping delays has become acute

THE PROMPT RETURN of our empty drums will relieve the situation substantially . . . will help to keep the flow of chemicals moving to you.

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Return your empties . . . you'll get your chemicals quicker.

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FUNGAL REQUIREMENTS

(*From page 23*)

DEPARTMENT OF THE AIR FORCE SPECIFICATIONS

71-854-A, Amend. 2. F, T
Aircraft Electronic Equipment; General Specification For.

7183 R, *
Junction Box J-271/APG-5C.

14141 M
Preservative; Non-Water-Repellent Treating Solution for Wood.

14155 M
Compound; Preventive, Sap Stain, Green Lumber.

14160, Amend. 1. M, *
Fungicide, Field-Treatment, Materiel Protectant.

16094E
Superseded by MIL-F-4143 (USAF).

16159 R, *
Cloth; Cotton (Water & Mildew Resistant).

16166 R, *
Duck; Coated Nylon.

41065B, Amend. 1, Notice 1. *
Equipment; General Specification for Environmental Test of.

16192, Amend. 1. T, **
Cord; Cotton, Buoyant, Mildew Proofed.

I. Add following "Bureau of Ships Specifications":

Bureau of Supplies and Accounts Specification

24 B 19 (Int) R, **
Bags, Canvas, Field, Women's, WN—1.

II. Add under NAVY DEPARTMENT SPECIFICATIONS:

24 C 20, Amend 1. R, **
Fire-, Water-, and Weather-Resistant.

27 N 1c R, **
Netting, Cotton, Insect; Marquisette.

III. Add to JAN-D-497 under Military Specifications:
Amend 1.

IV. Change MIL-F-2066 under MILITARY SPECIFICATIONS to:

MIL-F-2066A T, **
Flies: Fire, Water, Weather, and Mildew-Resistant, Tent, Wall, Large and Small, O.D.

V. Add under DEPARTMENT OF THE ARMY SPECIFICATIONS:

20-135A
Superseded by MIL-G-2279, Amend 1.

100-79
Superseded by MIL-T-3509

VI. Add to list of MILITARY SPECIFICATIONS:

MIL-C-1476A R, **
Creepers, Ice

MIL-C-1574A R, **
Carriers, Grenade, 3-Pocket

MIL-B-1744A R, **
Bag, Canvas, Mail, With Locking Strap

MIL-C-1793A R,**
Cover, Canvas, Bread Rack, Folding

MIL-G-2279, Amend 1. R, **
Grommet, Roll, Rubber, Cap, Service (Army)

MIL-S-2335 F, T
Synchros, 60 Cycle, 115 Volt

MIL-G-5058 (Aer) F
Generator; Tachometer, Four Pole (Propeller Synchronizer)

MIL-A-5076B (Aer), Amend 1. F
Amplifier; Flowmeter, Fuel, Jet Aircraft

MIL-T-5077B (Aer), Amend. 1. F
Transmitter: Flowmeter, Fuel, Jet Aircraft

MIL-I-5079B F
Indicator; Pressure, Aircraft, Alternating Current, Self-Synchronous, Magnet Rotor, Remote

MIL-T-5080B F
Transmitter: Pressure, Aircraft, Alternating Current, Self-Synchronous, Magnet Rotor, Remote

MIL-I-5084 (Aer) F
Indicator; Temperature, Thermocouple, Single, 0 to 1000°C (With Adjustable Limit Warning Light and Relay)

MIL-W-5086 R, *
Wire, Electrical, 600-Volt, Copper, Aircraft

MIL-C-5089A F
Control Amplifier, Altitude (P-1 Automatic Pilot/Radio Altimeter RT7/APN-1)

MIL-T-5091 (Aer) R, *
Transmission, Power, Constant Ratio: General Specification (Aircraft Use)

MIL-J-5094 (Aer) F
Junction Boxes; Power (P-3 Compass)

MIL-I-5098 (Aer) F
Indicator; Rate of Climb

FEDERATION CONVENTION

(*From page 33*)

A Survey of the Methods of Straining Employed in the Paint Industry—New England Club

A report on a survey of the methods used by 52 paint companies to eliminate contaminants from finely ground enamels. The paper reports and evaluates use of felt cloth, cotton, metal and vibratory screens, silk cloth, centrifuges, and cartridge type strainers according to rate of flow, life, or through-put of the strainer, efficiency, and cost of media.

The Flooding and Floating of Multi-Pigment Paint Systems—New York Club

Flooding describes a differential separation of pigments in a pigment mixture during the drying of a paint film. Floating is a related phenomenon of selective differential pigment separation resulting in a non-uniform surface. The scope of this work was restricted to a study of the effectiveness of silicone oils in reducing flooding and floating. A drop test for the effectiveness of anti-floating agents was developed.

A Study of Primers for Ferrous Metals on Atmospheric Exposure—New England Club

Results from a five year atmospheric exposure of 56 metal primers are presented. Definite conclusions can be drawn as to what type of primer will function best as a shop coat and what primers fail in this respect.

Research Papers

Prediction of the Storage Stability Properties of Alkyd Resin Enamels—M. C. Schroeder and R. L. Savage, Case Institute of Technology. Presented by E. G. Bobalek

Storage stability tests on enamels prepared from samples of two drying-oil modified alkyd resins were correlated with light-scattering measurements on dilute solutions of the alkyd resins in two solvents, acid number of the resins, and reactivity of the pigments.

The Oxidation of Films of Unsaturated Fatty Acid Esters—J. R. Chipault and W. O. Lundberg, University of Minnesota

Concurrent measurements of oxygen absorption, peroxide accumulation, and changes in ultraviolet spectral absorption were made on 1.25 mil films of the special oils used in the Federation Research Program. The studies have demonstrated that not only oxidation but the accompanying shifts of double bonds into conjugated positions are essential to oil drying.

Hardness, Abrasion Resistance, and Accelerated Weathering Tests on Pure, Pigmented and Unpigmented Paint Vehicles—E. B. Kiser and J. H. Coulliette, University of Chattanooga. Presented by W. E. Hood

The hardness and abrasion resistance and rate of erosion of 20 pure compounds were studied. Of these 20 compounds, 10 were oils and 10 were alkyd resins. The compounds were studied both in the clear and pigmented forms. There were three controls, two oils, and an alkyd resin.

Chemical Changes in Films With Aging—R. E. Dunbar, North Dakota Agricultural College

A series of 23 pigmented oils and alkyd resins, as supplied by the Federation of Paint and Varnish Production Clubs, was subjected as thin films, to the four sets of standard weathering and aging conditions. During this period they were each systematically checked for change in acid and saponification numbers. Additional samples were also aged in a weatherometer and the pigment loss due to chalking was determined at regular intervals. Similar tests for change in acid and saponification numbers made with 23 unpigmented oils and alkyd resins.

Changes in the Infrared Spectra of Some Synthetic Oils as a Function of Drying Time—K. Adams and R. W. Auxier, Westinghouse Research Laboratories, and C. E. Wilson, Zimmerman Company

This paper describes a method of measuring the infrared absorption spectrum of drying oils. The arrangement is such that changes in the infrared spectrum can be measured periodically during the process of drying. The changes taking place are shown for four compounds: dipentaerythritol stearate, dipentaerythritol oleate, dipentaerythritol linoleate, anl dipentaerythritol linolenate.

Depth to Which Oxygen Penetrates Drying Oil Films—L. L. Carrick, University of Michigan

The oxygen contents of films of varnish linseed oil, trilinolein, trilinolenin, pentaerythritol linoleate, dipentaerythritol linoleate, and trieleostearin have been determined for a series of film thicknesses and for various periods of aging under controlled conditions. A method is presented for estimating oxygen content as a function of depth in the film.

The Stress-Strain Properties of Clear and Pigmented Films of Pure Drying Oil Compounds—A. C. Elm, Standard Varnish Works and Toch Brothers, Inc. This work was carried on under the supervision of Dr. Elm in the Research Department of the New Jersey Zinc Company of Pennsylvania

This report describes the results of one phase of the research program on pure drying oil components undertaken several years ago by the Federation of Paint and Varnish Production Clubs. This study of the stress-strain properties of 12 clear and 12 pigmented coatings was carried out under the sponsorship of the Philadelphia Club.

Styrenation and Esterfication of Tall Oil—W. Bosch and R. B. Drubel, North Dakota Agricultural College

A series of tall oils varying in rosin and fatty acid contents was styrenated and esterified. The styrenations were made with mixtures of styrene monomer and alpha methyl styrene. White paints prepared with certain styrenated and esterified tall oils had very good brushability, color, flow and flexibility, showed good gloss and dried dust free in 1½ hours.

ADVERTISER'S INDEX

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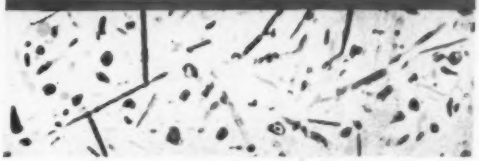

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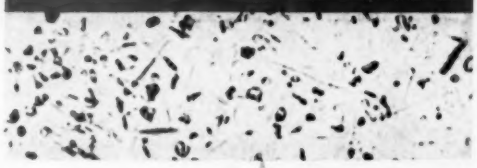

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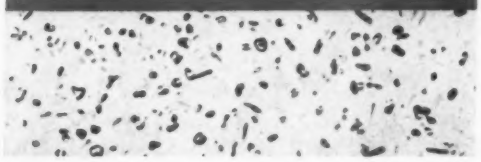

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